

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 5-01-067

NPDES NO. CA0079049

WASTE DISCHARGE REQUIREMENTS
FOR

CITY OF DAVIS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The City of Davis (hereafter Discharger) submitted a Report of Waste Discharge, dated 1 April 2000, and applied for a permit renewal to discharge waste under the National Pollutant Discharge Elimination System (NPDES) from their domestic Wastewater Treatment Plant.
2. The Discharger owns and operates a wastewater collection, treatment, and disposal system, and provides sewerage service within the city. The treatment plant is in Section 29 and 30, T9N, R3E, MDB&M, as shown on Attachment A, a part of this Order. Treated municipal wastewater is discharged to two points; Willow Slough Bypass, a water of the United States and a tributary to the Yolo Bypass at the point (001), latitude 38°, 35', 24", and longitude 121°, 39', 50" and the Conaway Ranch Toe Drain, a tributary to the Yolo Bypass, at the point (002), latitude 38°, 34', 33" and the longitude 121°, 38', 02". Willow Slough Bypass is tributary to the Conaway Ranch Toe Drain and both streams are tributary to the Yolo Bypass.
3. The existing treatment system consists of the following:

For Discharge Point 001 – the treatment train consists of screening, aerated grit removal and primary sedimentation, flow is then split between two aerated ponds and one lemna and three oxidation ponds, overland flow and chlorination and dechlorination. The treatment train is flexible and varies according to the flow and season.

For Discharge Point 002 – the treatment system consists of the same treatment train as Discharge 001 flow is then routed into a series of wetland pond tracts (up to seven tracts). All the wetland tracts have recirculation capability. The wetlands process was added to the treatment process to principally provide for the removal of metals concentrations. A stormwater lagoon in the wetlands is used in the winter months for treatment of stormwater runoff from the City's core area and north and west sectors. Stormwater and domestic wastewater may be commingled in the wetlands.

Biosolids is anaerobically digested, dewatered in on-site lagoons and land applied on-site in the overland flow fields or the wetlands in accordance with the facility's biosolids management plan or disposed off-site at the Yolo County Central Landfill.

The Report of Waste Discharge describes the discharge as follows:

Monthly Average (dry) Flow:	5.4	million gallons per day (mgd)
Design Flow (dry weather):	7.5	mgd
Average Temperature:	71°F	Summer
	68°F	Winter

<u>Constituent</u>	<u>mg/l</u>	<u>lb/Day</u>
Effluent BOD ¹ for 001	18.3	825
Effluent Total Suspended Solids for 001	29.8	1343
Effluent BOD ¹ for 002	4.8	216
Effluent Total Suspended Solids for 002	39.2	1766

¹ 5-day, 20°C biochemical oxygen demand

4. The U.S. Environmental Protection Agency (EPA) and the Board have classified this discharge as a major discharge.
5. The City of Davis expanded their treatment system in 1999 from 5.3 mgd to 7.5 mgd. The expansion included additional primary clarification, mechanical aerators for the aerated ponds, a lemna pond system to decrease suspended solids and a 400-acre wetland for disposal and possible trace pollutant reduction.

The wetlands are considered part of the wastewater treatment process and not a water of the State. The wetlands are managed and permit limitations have been included to prevent vector problems, nuisance, direct toxicity to wildlife, to minimize the occurrence of avian botulism and other infectious diseases and bioaccumulation in the food chain.

The wetlands process will attract wildlife. The permit requires that no toxic pollutants shall be present in the water column, sediments, or biota in concentrations that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in concentrations that are harmful to human health or aquatic resources. The Discharger's effluent has historically had elevated concentrations of selenium, although selenium levels have been reduced over time. In order to protect wildlife, the permit limitations allow no discharge of treated effluent to the wetlands if the selenium concentration in avian eggs exceed 8 µg/l. A milestone concentration of 4 µg/l selenium in avian eggs requires the City to submit a corrective action plan.

6. The City proposes to reclaim effluent from the wetlands system for irrigation of nearby agricultural fields. The quantity of water to be reclaimed will be variable depending on the needs of the reclaimed water users. The State of California Department of Health Services has established statewide reclamation criteria in Title 22, California Code of Regulations, Section 60301, et Seq. (hereafter Title 22) for the use of reclaimed water and has developed guidelines for specific uses. The City intends to submit an application to the Regional Water Quality Control Board requesting

Waste Discharge Requirements for the use of wastewater for reclamation after further evaluation of the feasibility of this project. The use of reclaimed water must comply with Title 22 criteria and will be regulated under separate Waste Discharge Requirements.

7. The Board adopted a *Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins* (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all waters of the Basin. These requirements implement the Basin Plan.
8. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. The Discharger has submitted priority pollutant sampling, with the Report of Waste Discharge (RWD) and in Monitoring Reports. Effluent Limitations, based on the sampling results have been included in this Order. The Discharger is required to provide additional sampling for NTR and CRT constituents at appropriate detection levels and this Order contains provisions that:
 - a. require the Discharger to provide information as to whether the levels of CTR and NTR constituents and EPA priority pollutants in the discharge cause or contribute to an in-stream excursion above a water quality objective;
 - b. if the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality objective, requires the Discharger to submit information to calculate effluent limitations for those constituents; and
 - c. allow the Board to reopen this Order and include effluent limitations for those constituents.
9. The Discharger disposes of biosolids on-site at the overland flow fields and wetlands. Additionally, the discharger is proposing to dispose of the biosolids adjacent to the southwest border of the oxidation ponds. The Discharger conducted a study on dioxins and furans accumulating in the biosolids to levels that may cause problems with biosolids disposal. The sampling results are inconclusive as to whether levels of dioxins and furans pose a problem with on-site biosolids disposal. Continued monitoring of the biosolids for dioxins and furans is required in this Order.
10. Section 13263.6(a), California Water Code, requires that "the regional board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the state board or the regional board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective". As detailed in the above Finding of the permit, there is insufficient effluent quality data available to determine if

there is reasonable potential to cause or contribute to an excursion above numeric water quality objectives in the Basin Plan or in State Board Plans, following completion of the required studies, this Order may be reopened and effluent limitations added.

11. The beneficial uses of Willow Slough Bypass and Conaway Ranch Toe Drain are not specifically identified in the Basin Plan, however the Plan states; "The beneficial uses of any specifically identified water body generally apply to its tributary streams. The Board finds that the beneficial uses identified in the Basin Plan for the Yolo Bypass are applicable to Willow Slough Bypass and Conaway Ranch Toe Drain.

The beneficial uses of Yolo Bypass downstream of the discharge as identified in Table II-1 of the Basin Plan are agricultural irrigation, agricultural stock watering, body contact water recreation, other non-body contact water recreation, warm freshwater aquatic habitat, cold freshwater aquatic habitat, warm fish migration habitat, cold fish migration habitat, warm spawning habitat, and wildlife habitat.

12. Upstream of the discharge points, Willow Slough Bypass is an ephemeral/low flow stream. At times Willow Slough Bypass and Conaway Ranch Toe Drain, provide little or no dilution for wastewater effluent discharged from the Davis Wastewater Treatment Plant. These waterways are used for the irrigation of crops, duck hunting and wetlands constructed in the Yolo Bypass are used as an educational facility for school children and others interested in wildlife. The California Code of Regulations, Title 22 (Title 22), contains criteria for the reuse or recycling of wastewater as an alternative to discharging to a receiving stream. Title 22 reclamation criteria were established to create minimum wastewater treatment standards to protect the public health when this water is reused for beneficial uses. The criteria are not directly applicable to streams that receive wastewater and the subsequent use of the combined stream/wastewater. This permit does not apply Title 22 standards to the discharge.

However, in assessing the discharge standards necessary to protect the beneficial uses of Willow Slough Bypass, Conaway Ranch Toe Drain and the Yolo Bypass, Title 22 standards were compared to the level of treatment required to protect the public health when directly using undiluted effluent for food crop irrigation and contact recreation. Title 22 states that it is necessary for wastewater to receive tertiary treatment with a coliform count of 2.2 MPN/100 ml as a 7-day median, for reuse as irrigation water for food crops and to protect for unrestricted contact recreation. Willow Slough Bypass, a low flow/ephemeral stream, and Conaway Ranch Toe Drain, ephemeral streams, are essentially the same as any other conveyance system (pipe or canal) when sufficient upstream flows are not present for dilution.

If the Department of Health Services (DHS) has determined that a specific level of treatment is required for recycled water delivered in a dedicated pipe or canal, then that same level of treatment would be necessary to protect the public if the water is delivered in a dry streambed for these same uses. In a letter to Board staff, dated 8 April 1999, DHS concurred with the need to protect beneficial uses and recommended that the level of treatment required, under Title 22 of the California Code of Regulations, for reclaimed water in a dedicated pipe or canal, be applied to

agricultural drains or streams where the water may be used or diverted for beneficial uses. Therefore, this permit includes tertiary effluent limitations based on protecting the beneficial uses of contact recreation and agricultural irrigation in Willow Slough Bypass and Conaway Ranch Toe Drain and the Yolo Bypass.

The Board finds that tertiary treatment (filtration) is required to protect the beneficial uses of contact recreation and agriculture downstream of the discharge Willow Slough Bypass and Conaway Ranch Toe Drain. The effluent limitation for coliform organisms is intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing pathogens. The method of treatment is not prescribed in this Order, but must meet the level of treatment or equivalent as specified in Title 22 and other recommendations by the California Department of Health Services. In addition to coliform testing, a turbidity effluent limitation has been included as a second indicator of the effectiveness of the treatment process and to assure compliance with the required level of treatment. The tertiary treatment process, or equivalent, is also capable of reliably meeting a reduced turbidity limitation of 2 NTU as a daily average. Failure of the filtration system such that virus removal is impaired would normally results in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. Coliform testing, by comparison, is not conducted continuously and requires several hours to days to identify high coliform concentrations. Effluent limitations for both BOD and TSS have been established at 10 mg/l, as a monthly average, which is technically based on the capability of the designed tertiary system. Discharging only tertiary wastewater in conformance with the Department of Health Services recommendations protects the beneficial uses of water contact recreation and agricultural irrigation. A time schedule to allow the Discharger to come into compliance with the effluent limitation is also included in this Order.

13. USEPA adopted the *National Toxics Rule* (NTR) on 5 February 1993 and the *California Toxics Rule* (CTR) on 18 May 2000. These Rules contain water quality standards applicable to this discharge. The State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan (SIP)) that contains guidance on implementation of the NTR and CTR. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numeric water quality standard. Based on information submitted as part of the application, in studies, and from the Davis Wastewater Treatment Plant monitoring and reporting program, the Board finds that the proposed discharge has a reasonable potential to exceed standards and objectives for the constituents discussed below. Effluent limitations have been included in this Order based on the NTR and CTR water quality standards and in accordance with the SIP. A compliance time schedule has been included in Provision No. 3.
 - a. Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR and NTR Standards for bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate is a plasticizer that has a relatively low solubility in water and relatively low volatility.

ethylhexyl) phthalate is added to plastic products to increase flexibility and is commonly found in products and containers, hospital and laundry discharges, and adhesives, paper, pesticides, and flexible plastic pipes and tubing. Its use in common products and industry indicate that it is a likely contaminant of the Discharger's wastewater confirming the reasonable potential of its presence.

The National Toxics Rule (NTR) and CTR Standards for bis(2-ethylhexyl)phthalate are Water Quality Criteria for Human Health. The NTR and CTR receiving water limit for bis(2-ethylhexyl)phthalate is $5.9 \mu\text{g/l}$ where drinking water is not a designated beneficial use. At least seven samples showed bis(2-ethylhexyl)phthalate in the effluent. Two effluent samples exceeded CTR and NTR Standards for bis(2-ethylhexyl)phthalate. Effluent limitations for bis(2-ethylhexyl)phthalate, based on the NTR and CTR Standards, are included in this Order.

- b. Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standards for halogenated aromatic hydrocarbons that include dioxin or its congeners, TCDD equivalents. HpCDD's total were 170 pg/l , 1,2,3,4,6,7,8- HpCDD was 95 pg/l and OCDD was 260 pg/l in the March 1998 sampling for the effluent. In December 1999, the total TCDDs were 9.0 pg/l in the wetlands. Additionally, furans were identified in the wastewater in March 1998. HxCDF's total was 26 pg/l , 1,2,3,4,7,8-HxCDF was 26 pg/l , HpCDF's were 50 pg/l and 1,2,3,4,7,8, 9-HpCDF was 50 pg/l . These congeners have assigned Toxic Equivalency Factors relative to toxicity of 2,3,7,8-TCDD. The CTR receiving water limit for dioxin (2,3,7,8-TCDD) is $0.000000014 \mu\text{g/l}$ (or 0.014 pg/l) where drinking water is not a designated beneficial use. Laboratory data provided by the Discharger for wastewater treatment plant effluent of dioxin congener samples exceeded CTR Standards for dioxin. The SIP requires the inclusion of effluent limitations where the effluent sampling has exceeded the water quality standard. The effluent sampling which exceed the CTR water quality standard presents a reasonable potential for continued exceedance of the standard and an effluent limitation for dioxin is included in this Order.
- c. Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR and NTR Standards for copper. Copper was detected in eleven of eleven samples at concentrations ranging between 0.0076 and $22 \mu\text{g/l}$. U.S. EPA developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for copper. The CTR includes the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for copper. The acute (1-hour average) and chronic (4-day average) criteria are hardness dependent. U.S. EPA and the CTR represent the criteria in a table, equations, and a graph. The relative toxicity of copper increases with decreasing hardness. The 4-day average criteria is calculated using the worst-case hardness for the receiving water. The hardness data provided by the Discharger for Willow Slough Bypass averaged 297 mg/l with a range of $190 - 420 \text{ mg/l}$. In the table created by U.S. EPA that shows the relationship between copper and hardness, at the worst-case or lowest hardness concentration detected at Willow Slough Bypass is 190 mg/l , the 4-day

average toxic concentration of copper would be 16 $\mu\text{g/l}$. The 1-hour average is calculated using the worst-case hardness for effluent. The worst-case hardness for the effluent is 386 mg/l and the 1-hour average concentration of copper would be 50 $\mu\text{g/l}$. The highest detection level exceeds the water quality limit therefore, concentration based effluent limits for copper, based on the hardness dependent criteria (Attachment D) of the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, are included in this Order. The discharger submitted information on metal translators. Regional Board staff reviewed the study and found it was inadequate. The information submitted lacked the documentation and methodology required by US EPA. The conversion factors for acute copper is 0.96 and for chronic is 0.96 as required in the CTR. A time schedule to allow the Discharger to come into compliance with the effluent limitation is included in Provision No. 3 of this Order.

- d. Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standard for selenium. U.S. EPA developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life as recommended limitations to protect against aquatic toxicity. The CTR includes the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for selenium at 5.0 $\mu\text{g/l}$ for the four-day limit. The effluent limit for selenium, included in this Order, is presented in total concentration, and is based on U.S. EPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life as included in the CTR. Selenium is a heavy metal and is present in the City's water supply. The City has successfully reduced selenium levels over the past several years, however, selenium is still detected as high as 7.6 $\mu\text{g/l}$ in 1999, after the construction of the wastewater treatment improvements including the wetlands process and thus continues to be a problem.
- e. Based on information submitted as part of the application, in studies, and in monitoring reports, heptachlor, an organochlorine pesticide, in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above CTR Standards for organochlorine pesticides. Heptachlor was detected in August 1998 at 0.0765 $\mu\text{g/l}$. However, the Basin Plan requires that: no individual pesticides shall be present in concentrations that adversely affect beneficial uses; discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses; total chlorinated hydrocarbon pesticides shall not be present in the water column at detectable concentrations; and pesticide concentrations shall not exceed those allowable by applicable antidegradation policies. The detection of heptachlor in the treatment plant effluent presents a reasonable potential to exceed the Basin Plan limitations for organochlorine pesticides. In addition to the Basin Plan requirements, the CTR developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life as recommended limitations to protect against aquatic toxicity. The heptachlor detected exceeded the CTR limits for chronic effluent limitations for organochlorine pesticides and Basin Plan requirements, are included in this Order. In addition to heptachlor, the organochlorine pesticides include alpha BHC, beta BHC, delta BHC, gamma BHC, DDD, DDE, DDT, aldrin, chlordane, dieldrin, endrin and endrin aldehyde, alpha and beta endosulfan and endosulfan sulfate, heptachlor and heptachlor epoxide, and toxaphene. Endrin, alpha and beta endosulfan,

dieldrin, toxaphene, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD and heptachlor epoxide were not detected, but the detection levels were higher than the water quality limits. A time schedule to allow the Discharger to come into compliance with the effluent limitation is also included in this Order.

- f. Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR and NTR Standards for polycyclic aromatic hydrocarbons. Polycyclic aromatic hydrocarbons include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene. The CTR Standard for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene is 0.049 µg/l for each constituent. In December 1999, the samples showed 12 µg/l, 11 µg/l, 9.9 µg/l, 8.4 µg/l and 13 µg/l, respectively. Other laboratory samples provided by the Discharger for wastewater treatment plant effluent samples showed non-detect however, the detection level exceeded the limit. Effluent limitations for polycyclic aromatic hydrocarbons, based on the CTR Standards, are included in this Order.
- g. This Order and the Basin Plan prohibit the discharge of toxic constituents in toxic amounts. Chlorine is used at the wastewater treatment plant as a disinfectant and, based on experience, has a reasonable potential to cause or contribute to a violation of the Basin Plan narrative prohibition of the discharge of toxic substances in toxic concentrations. It is not uncommon for wastewater treatment plants to occasionally experience problems with the controllers used to dose chlorine and dechlorination chemicals, causing discharges of excess chlorine to surface waters. U.S. EPA has developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life. Effluent limitations for chlorine based on U.S. EPA's Ambient Water Quality Criteria recommended for the Protection of Freshwater Aquatic Life, are included in this Order.
- h. Untreated wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrate, and denitrification is a process that converts nitrate to nitrogen gas, which is then released to the atmosphere. Wastewater treatment plants commonly use the nitrification process to remove ammonia from the waste stream. Inadequate or incomplete nitrification or denitrification may result in the discharge of ammonia or nitrate to the receiving stream. Ammonia is known to cause toxicity to aquatic organisms in surface waters. The discharge from the Davis Wastewater Treatment Plant has a reasonable potential to cause or contribute to an in-stream excursion above water quality standards for ammonia. Ammonia at the Davis Wastewater Treatment Plant can be as high as 15.5 mg/l. Under most conditions, this level of ammonia is toxic to aquatic life.

This Order and the Basin Plan prohibit the discharge of toxic constituents in toxic amounts. Based on information submitted as part of the application, in monitoring reports, and in studies, the discharge has been toxic to aquatic life and has a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan narrative prohibition against the discharge of toxic constituents in toxic concentrations for ammonia. The U.S. EPA has developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, recommending acute

criteria for ammonia that are pH-dependent and chronic criteria that are pH- and temperature-dependent. Effluent limitations for ammonia, based on U.S. EPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, are included in this Order.

Recent toxicity studies have indicated a possibility that nitrate is toxic to aquatic organisms. In the past, the Discharger has not collected effluent samples for nitrate analysis and the toxic effects, if any, of nitrate in the Davis Wastewater Treatment Plant effluent is not known. Additionally, nitrates can be biostimulating, promoting aquatic growth that cause nuisance or adversely affect beneficial uses. This Order contains provisions that require the Discharger to provide information as to whether levels of nitrate in the discharge cause or contribute to an in-stream excursion above a narrative or numeric water quality standard, and, if nitrate does cause or contribute to an in-stream excursion above a narrative or numeric water quality standard, require the Discharger to submit information to calculate effluent limitations for nitrate. This Order also contains provisions that allow the Board to reopen this Order and include an effluent limitation for nitrate.

- i. Domestic and industrial use of water, results in an increase in the mineral content of the wastewater. The salinity of wastewater is determined by measuring electrical conductivity (EC), an important parameter in determining the suitability of wastewater for irrigation. When water evaporates, salts accumulate in soil. With increasing salinity in the soil of the root zone, plants expend more energy on adjusting the salt concentration in plant tissues to obtain needed water from the soil, and less energy is available for growth. The electrical conductivity at the Davis Wastewater Treatment Plant averages 2025 μmhos and is as high as 2475 μmhos . To protect the beneficial use of water for agricultural use, studies have recommended an Agricultural Water Quality Goal of 700 $\mu\text{mhos/cm}$, for EC. Willow Slough Bypass and Conaway Ranch Toe Drain are low flow/ephemeral; therefore, water drawn from the receiving streams for irrigation may be undiluted or relatively undiluted effluent. To reduce concentrations of dissolved salts in the effluent, the Discharger is required to conduct a study to identify sources of and control dissolved salts discharged within the collection system. Once the study has been completed, the Board may determine that effluent limitations for EC are necessary. This Order contains a Provision that requires a study of salt reduction measures and allows the Board to reopen this Order, if necessary, and add effluent limitations for EC.
- j. Some constituents were not detected in the effluent, however the detection levels were higher than the limits in the CTR or NTR or Ambient Water Quality Criteria or the Basin Plan. Some of these constituents are covered under the organochlorine pesticides or the polycyclic aromatic hydrocarbons and will be covered under the effluent limit. The remaining constituents will need to be monitored quarterly at minimum detection levels. The discharger will need to complete a work plan for approval by the Regional Board for the monitoring of priority pollutants. Some constituents may not be able to be sampled at a detection level low enough to determine compliance with water quality limits. This Order contains provisions that allow the Board to reopen this Order and include effluent limitations for those constituents that show a reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard.

14. Pond Discharge Specifications, for pond treatment and disposal, have been included in this Order to ensure compliance with the designated beneficial uses in the Basin Plan. The Pond Specifications are designed to prevent overflow, levee failure, and nuisance conditions.
15. The beneficial uses of the underlying groundwater are municipal and domestic, industrial service, industrial process, and agricultural supply.
16. Domestic wastewater discharged to land, and into treatment basins, may percolate through the soil and increase the concentrations of nitrates, dissolved salts, metals, and other constituents in groundwater. Drinking water and agricultural supply are the beneficial uses most likely affected by the constituents discharged. Constituent concentrations and indicator parameters, including total dissolved solids (TDS), electrical conductivity (EC), and biological oxygen demand, provide an indication of the level of pollution of the groundwater. The increase in the concentrations of these constituents in groundwater must be consistent with the antidegradation provisions of State Water Resources Control Board Resolution 68-16. To remain consistent with Resolution No. 68-16, wastewater discharged to land shall not exceed background water quality, groundwater quality objectives, unreasonably affect beneficial uses, or cause pollution or nuisance.
17. The permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board Resolution 68-16. This Order does not provide for an increase in the volume and mass of pollutants discharged.
18. There will be additional costs for adding tertiary treatment facilities. There is a very high likelihood that the addition of tertiary treatment will resolve many of the compliance issues with the effluent limitations for other constituents, except ammonia and nitrates. Therefore, the costs associated with the addition of tertiary treatment may additionally achieve compliance with the other discharge limitations.

The costs associated with compliance with the proposed permit limitations are reasonable. As of 1 January 1999 the City of Davis' single-family sewer rate fee was \$13.90. For Yolo County, the equivalent single family sewer rate fee, as of 1 January 2000, was \$15.90. State wide, the single-family sewer rate fee is \$19.71. The City's sewer rates are significantly lower than surrounding areas and the and the state of California.

The costs to irrigated agriculture, if they could not utilize the water in the Yolo Bypass due to the City's discharge could be significant. The California Department of Health Services recommends that food crops not be irrigated with secondary treated wastewater unless it is diluted with 20 parts of clean water. The California Department of Health Services also recommends that body contact recreational activities be significantly limited without a tertiary level of treatment. The medical costs due to illness from human contact with secondary wastewater would be difficult to fully assess. The increase in sewer rates to the state-wide average would be reasonable to protect the beneficial uses of the receiving stream.

19. Effluent limitations, and toxic and pretreatment effluent standards established pursuant to Sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act (CWA) and amendments thereto are applicable to the discharge.
20. The Central Valley Regional Water Quality Control Board shall notice a reconsideration of this permit within 60 days of the date of the final judgment by the San Francisco Superior Court in *WaterKeepers Northern California, et al.*, Case No. 312513, for the purpose of modifying the permit to make it consistent with the judgment of the Court in this matter where any term, limitation, or provision is inconsistent with the judgment. The permit shall be modified within the time period established by the Court in this matter.
21. The discharge is presently governed by Waste Discharge Requirements Order No. 95-235, adopted by the Board on 27 October 1995.
22. The action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21100, et seq.), requiring preparation of an environmental impact report or negative declaration in accordance with Section 13389 of the California Water Code.
23. The Board has considered the information in the attached Information Sheet in developing the Findings of this Order. The attached Information Sheet is part of this Order.
24. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
25. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.
26. This Order shall serve as an NPDES permit pursuant to Section 402 of the CWA, and amendments thereto, and shall take effect upon the date of hearing, provided EPA has no objections.

IT IS HEREBY ORDERED that Order No.95-235 is rescinded and the City of Davis, its agents, successors and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. Discharge of wastewater at a location or in a manner different from that described in the Findings is prohibited.

2. By-pass or overflow of wastes to surface waters is prohibited, except as allowed by Standard Provision A.13. [See attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)"].
3. Neither the discharge nor its treatment shall create a nuisance as defined in Section 13050 of the California Water Code.

B. Effluent Limitations through 1 January 2006:

1. Effluent (001, 002) from the wastewater treatment plant shall not exceed the following limits:

<u>Constituents</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Weekly Average</u>	<u>Monthly Median</u>	<u>Daily Maximum</u>
BOD ¹	mg/l	30 ²	45 ²		90 ²
	lbs/day	1876	2815		5633
Total Suspended Solids (TSS)	mg/l	50 ²	75 ²		150 ²
	lbs/day	3129	4694		9388
Settleable Solids	ml/l	0.1			0.2
Chlorine Residual	mg/l				0.02
Total Coliform Organisms ³	MPN/100 ml			23	500
Selenium	µg/l		5.0		
	lbs/day		0.3		

¹ 5-day, 20 °C biochemical oxygen demand (BOD)

² To be ascertained by a 24-hour composite

³ The total coliform organism sample may be collected immediately following the chlorination process.

C. Effluent Limitations after 1 January 2006:

1. Effluent shall not exceed the following limits at discharge points 001 and 002:

<u>Constituent</u>	<u>Units</u>	<u>Daily Maximum</u>	<u>Daily Average</u>	<u>Weekly Average</u>	<u>Monthly Average</u>
BOD ¹	mg/l	20 ²	--	15 ²	10 ²
	lbs/day ³	1252	--	939	625
Total Suspended Solids (TSS)	mg/l	20 ²	--	15 ²	10 ²
	lbs/day ³	1252	--	939	625
Turbidity	NTU	5	2	--	--
Settleable Solids	ml/l	0.2	--	--	0.1

¹ 5-day, 20 °C biochemical oxygen demand (BOD)

² To be ascertained by a flow proportional 24-hour composite sample

³ Based upon a design treatment capacity of 7.5 mgd ($x \text{ mg/l} \times 8.345 \times 7.5 \text{ mgd} = y \text{ lbs/day}$)

<u>Constituent</u>	<u>Units</u>	<u>1-Hour Average</u> ¹	<u>4-Day Average</u> ²	<u>30-Day Average</u>	<u>Daily Maximum</u>
Chlorine Residual	mg/l	0.02	0.01	--	--
	lbs/day	1.25	0.62		
Ammonia	mg N/l	Attachment B		Attachment C ²	--
Bis(2-ethylhexyl)	µg/l	--	--	--	5.9
phthalate	lbs/day				0.36
Organochlorine Pesticides	µg/l	--	--	--	ND ³
Copper	µg/l	Attachment D	Attachment D	--	--
Dioxin (2,3,7,8-TCDD)	pg/l	--	--	--	0.014
and congeners	lbs/day				0.000001
PAH's ⁴	µg/l	--	--	--	0.049
	lbs/day				0.0031
Selenium	µg/l	20.0	5.0	--	--
	lbs/day	1.25	0.31		

¹ Maximum Concentration

² Continuous Concentration

³ The Non-Detectable (ND) limitation applies to each individual pesticide. No individual pesticide may be present in the discharge at detectable concentrations. The Discharger shall use EPA standard analytical techniques with the lowest possible detectable level for organochlorine pesticides with a maximum acceptable detection level of 0.05 µg/l.

⁴ Polycyclic aromatic hydrocarbons, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene.

<u>Constituent</u>	<u>Units</u>	<u>7-Day Median</u> ¹	<u>Single Sample, 30-Day Maximum</u> ²
Total Coliform Organisms	MPN/100 ml	2.2	23 to 240

¹ 7-Day Median is based on the sample results of the previous seven days

² In a 30-day period, only a single sample may exceed 23 MPN/100 ml and no sample should exceed 240 MPN/100 ml.

2. Wastewater shall be oxidized, coagulated and filtered, and disinfected or equivalent treatment provided.
3. The discharge shall not have a pH less than 6.5 nor greater than 8.5.
4. The average dry weather (generally May through October) discharge flow shall not exceed 7.5 million gallons.
5. Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay - - - - - 70%

Median for any three or more consecutive bioassays - - - - 90%

D. Pond Limitations:

1. Objectionable odors originating at this facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas or property owned by the Discharger.
2. As a means of discerning compliance with Pond Discharge Limitation No. 1, the dissolved oxygen content in the upper zone (1 foot) of wastewater in ponds shall not be less than 1.0 mg/l.
3. Ponds shall not have a pH less than 6.5 or greater than 9.0.
4. Ponds shall be managed to prevent breeding of mosquitos. In particular,
 - a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.
 - b. Weeds shall be minimized.
 - c. Dead algae, vegetation, and debris shall not accumulate on the water surface.
5. Public contact with wastewater shall be precluded through such means as fences, signs, and other acceptable alternatives.
6. Ponds shall have sufficient capacity to accommodate allowable wastewater flow and design seasonal precipitation and ancillary inflow and infiltration during the nonirrigation season. Design seasonal precipitation shall be based on total annual precipitation using a return period of 25 years, distributed monthly in accordance with historical rainfall patterns. Freeboard shall never be less than two feet (measured vertically to the lowest point of overflow).

E. Biosolids Disposal:

1. Collected screenings, biosolids, harvested lemna vegetation and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer, and consistent with *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Subdivision 1, Section 20005, et seq.
2. Any proposed change in biosolids use or disposal practice from a previously approved practice shall be reported to the Executive Officer and EPA Regional Administrator at least **90 days** in advance of the change.
3. Use and disposal of sewage biosolids shall comply with existing Federal and State laws and regulations, including permitting requirements and technical standards included in 40 CFR 503.

If the State Water Resources Control Board and the Regional Water Quality Control Boards are given the authority to implement regulations contained in 40 CFR 503, this Order may be reopened to incorporate appropriate time schedules and technical standards. The Discharger must comply with the standards and time schedules contained in 40 CFR 503 whether or not they have been incorporated into this Order.

4. The Discharger is encouraged to comply with the "Manual of Good Practice for Agricultural Land Application of Biosolids" developed by the California Water Environment Association.
5. Every April, the Discharger shall submit a biosolids disposal plan describing the annual volume of biosolids generated by the plant and specifying the disposal practices.
6. The discharger shall comply with the attached Monitoring and Reporting Program No. 5-01-067 for biosolids disposal.

On-site Biosolids Disposal Limitations:

7. The discharge of tailwater or field runoff within 30 days after application of biosolids is prohibited for application areas where biosolids has not been incorporated into the soil and there is not sufficient vegetation in the application area and along the path of runoff to prevent movement of biosolids particles from the application site.
8. The direct or indirect discharge of biosolids to surface waters or surface water drainage course is prohibited.
9. The discharge of waste classified as "hazardous" or "designated" as defined in Section 2521 (a) and Section 2522 (a) of Chapter 15, is prohibited.

10. The onsite application of biosolids at rates in excess of the nitrogen requirements of the vegetation or at rates that would cause the excess nitrogen or metals to leach to ground water, is prohibited. All sources (wastewater, fertilizers, biosolids) of nitrogen and metals to the application area must be included in the analysis of the total loading rate.
11. The onsite discharge of biosolids with pollutant concentrations greater than those shown below is prohibited:

Constituent	Ceiling Concentration Mg/kg dry weight
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Nickel	420
Selenium	100
Zinc	7500

12. Biosolids shall not be applied to land subject to erosion during a flood, or having a surface slope in excess of fifteen percent.
13. Biosolids shall comply with either Class A or Class B pathogen reduction standards as listed in 40 CFR 503.
14. Biosolids shall comply with one of the Vector Attraction Reduction standards as listed in 40 CFR 503.33.
15. Biosolids shall not be applied to land in amounts which cause the following lifetime cumulative loading rates to be exceeded:

Cumulative Loading Rates

Constituent	kg/hectare	lbs./acre
Arsenic	41	37
Cadmium	39	35
Chromium	3000	2672
Copper	1500	1336
Lead	300	267
Mercury	17	15
Molybdenum	18	16
Nickel	420	374
Selenium	100	89
Zinc	2800	2494

16. Staging areas and biosolids application shall be at least 100 feet from surface waters.
17. Biosolids shall not be deposited to flooded, frozen or water-saturated ground, or during periods of heavy rainfall.
18. Objectionable odor originating at this facility shall not be perceivable beyond the limits of the property owned or controlled by the discharger.

Class B Biosolids

19. Staging areas and biosolids application shall be at least:
 - a. 10 feet from property lines.
 - b. 500 feet from domestic water supply wells.
 - c. 50 feet from non-domestic water supply wells.
 - d. 20 feet from public roads.
 - e. 100 feet from surface waters.
 - f. 100 feet from residential buildings.
20. After the last application of biosolids in each field, the Discharger shall ensure the following:
 - a. For at least 30 days:
 - (1) Public access to the application area is restricted;
 - (2) Feed and fiber crops are not harvested; and
 - (3) Animals do not graze on the land.
 - b. For at least 12 months:
 - (1) Turf is not harvested if turf is placed on land with a high degree of public exposure:
and
 - (2) If the field is used as pasture, grazing by milking animals is prevented.
 - c. For at least 14 months:
 - (1) Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface are not harvested.
 - d. For at least 38 months:
 - (1) Food crops with harvested parts below the land surface are not harvested; and
 - (2) If the field is used as pasture, grazing of milking animals used for producing unpasteurized milk for human consumption is prevented.

Biosolids Storage Specifications

21. Facilities for the storage of Class B biosolids shall be located, designed and maintained to restrict public access to biosolids.

22. Biosolids storage facilities shall be designed and maintained to prevent washout or inundation from a storm or flood with a return frequency of 100 years.
23. Biosolids storage facilities, which contain biosolids, shall be designed and maintained to contain all storm water falling on the biosolids storage area during a rainfall year with a return frequency of 100 years.
24. Biosolids storage facilities shall be designed, maintained and operated to minimize the generation of leachate.

F. Receiving Water Limitations:

Receiving Water Limitations are based upon water quality objectives contained in the Basin Plan. As such, they are a required part of this permit. However, a receiving water condition not in conformance with the limitation is not necessarily a violation of this Order. If it is determined that such a condition exists, the Board may require the Discharger to conduct an investigation to confirm and characterize the water quality condition. Based on the outcome of this investigation, the Board may take appropriate action.

The discharge shall not cause the following in the receiving water:

1. Concentrations of dissolved oxygen to fall below 7.0 mg/l.
2. Oils, greases, waxes, or other materials to form a visible film or coating on the water surface or on the stream bottom.
3. Oils, greases, waxes, floating material (liquids, solids, foams, and scums) or suspended material to create a nuisance or adversely affect beneficial uses.
4. Esthetically undesirable discoloration.
5. Fungi, slimes, or other objectionable growths.
6. The turbidity to increase as follows:
 - a. More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.
 - b. More than 20 percent where natural turbidity is between 5 and 50 NTUs.
 - c. More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.
 - d. More than 10 percent where natural turbidity is greater than 100 NTUs.

7. The ambient pH to fall below 6.5, exceed 8.5, or change by more than 0.5 units. The pH change by 0.5 units shall be averaged over a period of 30 days.
8. The ambient temperature to increase more than 5°F.
9. Deposition of material that causes nuisance or adversely affects beneficial uses.
10. Radionuclides to be present in concentrations that exceed maximum contaminant levels specified in the California Code of Regulations, Title 22; that harm human, plant, animal or aquatic life; or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
11. Aquatic communities and populations, including vertebrate, invertebrate, and plant species, to be degraded.
12. Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health.
13. Violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board pursuant to the CWA and regulations adopted thereunder.
14. Taste or odor-producing substances to impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to cause nuisance or adversely affect beneficial uses.
15. The fecal coliform concentration in any 30-day period to exceed a geometric mean of 200 MPN/100 ml or cause more than 10 percent of total samples to exceed 400 MPN/100 ml.

G. Groundwater Limitations:

The discharge shall not cause the underlying ground water to:

1. The discharge, in combination with other sources, shall not cause underlying groundwater to contain waste constituents in concentration statistically greater than background water quality, except for coliform bacteria. For coliform bacteria, increases shall not cause the most probable number of total coliform organisms to exceed 2.2 MPN/100 ml over any 7-day period.

H. Wetlands Limitations:

1. The geometric mean selenium concentration in avian eggs shall not exceed 4 $\mu\text{g/g}$ (dry weight basis) in any one sampling period. If the selenium concentration is exceeded, the Discharger shall submit a remedial action workplan to reduce the concentrations in avian eggs. The workplan shall be implemented immediately upon approval of the Executive Officer.
2. The geometric mean selenium concentration in avian eggs shall not exceed 8 $\mu\text{g/g}$ (dry weight basis) in any one sampling period. If the selenium concentration is exceeded, the Discharger shall immediately cease the discharge of wastewater into the wetlands. Wastewater shall not be reintroduced until it can be shown to the satisfaction of the Executive Officer that the concentrations have been sufficiently reduced to protect wildlife and maintain the mean avian egg selenium concentration below 8 $\mu\text{g/g}$.
3. Toxic pollutants shall not be present in the water column, sediments, or biota in concentrations that produce detrimental response in human, plant, animal or aquatic life; or that bioaccumulate in concentration that are harmful to human health or aquatic resources. The discharge into the wetlands shall not cause aquatic communities and populations, including vertebrate, invertebrate and plant species, to be degraded as determined by acute or chronic toxicity analysis, wetlands monitoring or technical reports required by the Executive Officer.
4. The wetlands must be managed so as not to create vector problems and to minimize the occurrence of avian botulism and other infectious diseases. The local mosquito abatement district or Yolo County Environmental Health Department shall be consulted annually to determine if changes need to be made in procedures in managing the wetlands for vector control.

I. Provisions:

1. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency except for the overland flow system that shall be designed, constructed, operated and maintained to prevent inundation or washout due to flood with a 50-year frequency.
2. The Discharger shall not allow pollutant-free wastewater to be discharged into the collection, treatment, and disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.
3. The Discharger shall comply with the following time schedule to assure compliance with effluent limitations that require tertiary treatment, continuous turbidity monitoring, nitrification and denitrification, and compliance with NTR, CTR and toxicity based

limitations contained in Effluent Limitation No. C. Bis(2-ethylhexyl) phthalate, polycyclic aromatic hydrocarbons and heptachlor, a persistent chlorinated hydrocarbon pesticide (Organochlorine Pesticide), dioxin (effluent and biosolids), copper, and selenium, were detected in the effluent from the Davis Wastewater Treatment Plant. Effluent limits are included in this Order for these constituents. To allow the Discharger time to comply with the effluent limitations, a compliance schedule is included. As a means for determining progress toward compliance, the Discharger shall, beginning **30 September 2001 and quarterly thereafter**, submit quarterly progress reports to the Board describing actions taken to achieve compliance with this Order. By **1 January 2006**, the Discharger shall comply with this Order.

<u>Task</u>	<u>Compliance Date</u>	<u>Report Due</u>
Submit Facilities Plan	-----	March 1, 2002
Submit Construction Schedule	September 2003	September 1, 2003
Full Compliance	January 2006	January 1, 2006
Annual Progress Reports	Every April	

The Discharger shall submit to the Board on or before each compliance report due date, the specified document or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, the reasons for such noncompliance shall be stated, plus an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Board by letter when it returns to compliance with the time schedule.

- The discharge may contain dissolved salts (expressed as electrical conductivity, EC), that may have a reasonable potential to cause or contribute to an exceedance of narrative or numerical water quality objectives for dissolved salts (expressed as EC). The Discharger shall conduct a study of the potential effects of dissolved salts (expressed as EC). The study shall also include an assessment of dissolved salts discharged into the wastewater system. The salt assessment shall be sufficient to determine the source of salt (industry, water supply, water softener, etc.) and recommend necessary control measures. The Discharger shall comply with the following compliance schedule in conducting the study:

<u>Task</u>	<u>Compliance Date</u>
Submit Workplan and Time Schedule	45 days after permit adoption
Begin Study	4 months after permit adoption
Complete Study	2 years after beginning of study
Submit Study Report	2 months after completion of study

The Discharger shall submit to the Board on or before each compliance date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Board by letter when it returns to compliance with the time schedule.

5. There are indications that the discharge may contain constituents that have a reasonable potential to cause or contribute to an exceedance of water quality objectives: NTR and CTR constituents, and EPA priority pollutants as described in Finding No. 8. The Discharger shall comply with the following time schedule in conducting a study of these constituents potential effect in surface waters:

<u>Task</u>	<u>Compliance Date</u>
Submit Workplan ^a and Time Schedule	45 days after permit adoption
Begin Study	4 months after permit adoption
Complete Study	2 years after beginning of study
Submit Study Report	2 months after completion of study

a The work plan shall include the minimum detection levels achievable for each constituent or priority pollutant.

The Discharger shall submit to the Board on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Board by letter when it returns to compliance with the time schedule.

If after review of the study results it is determined that the discharge has reasonable potential to cause or contribute to an exceedance of a water quality objective this Order will be reopened and effluent limitations added for the subject constituents.

6. The Discharger shall conduct the chronic toxicity testing specified in the Monitoring and Reporting Program. If the testing indicates that the discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the water quality objective for toxicity, the Discharger initiate a Toxicity Identification Evaluation (TIE) to identify the causes of toxicity. Upon completion of the TIE, the Discharger shall submit a workplan to conduct a Toxicity Reduction Evaluation (TRE) and, after Board evaluation, conduct the TRE. This Order will be reopened and a chronic toxicity limitation included and/or a limitation for the specific toxicant identified in the TRE included. Additionally, if a chronic toxicity water quality objective is adopted by the State Water Resources Control Board, this Order may be reopened and a limitation based on that objective included.

7. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)", dated 1 March 1991, which are part of this Order. This attachment and its individual paragraphs are referred to as "Standard Provisions."
8. The Discharger shall comply with Monitoring and Reporting Program No. 5-01-067, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
9. When requested by USEPA, the Discharger shall complete and submit Discharge Monitoring Reports. The submittal date shall be no later than the submittal date specified in the Monitoring and Reporting Program for Discharger Self Monitoring Reports. This Order expires on **1 March 2006** and the Discharger must file a Report of Waste Discharge in accordance with Title 23, CCR, not later than 180 days in advance of such date in application for renewal of waste discharge requirements if it wishes to continue the discharge.
10. The Discharger shall enforce the Pretreatment Standards promulgated under Sections 307(b), 307(c) and 307(d) of the Clean Water Act. The Discharger shall perform the pretreatment functions required by 40 CFR Part 403 including but not limited to:
 - a. Adopting the legal authority required by 40 CFR 403.8(f)(1);
 - b. Enforcing the Pretreatment Standards of 40 CFR 403.5 and 403.6;
 - c. Implementing procedures to ensure compliance as required by 40 CFR 403.8(f)(2); and
 - d. Providing funding and personnel for implementation and enforcement of the pretreatment program as required by 40 CFR 403.8(f)(3).

Submit an annual pretreatment program report by April 1st of each year.

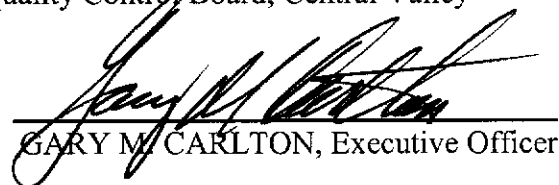
11. The Discharger shall implement its approved pretreatment program and the program shall be an enforceable condition of this permit. If the Discharger fails to perform the pretreatment functions, the Regional Water Quality Control Board (RWQCB), the State Water Resources Control Board (SWRCB) or the U.S. Environmental Protection Agency (U.S. EPA) may take enforcement actions against the Discharger as authorized by the Clean Water Act.
12. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the necessary legal authorities, programs, and controls to ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:
 - a. Wastes that create a fire or explosion hazard in the treatment works;

- b. Wastes which will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;
 - c. Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;
 - d. Any waste, including oxygen demanding pollutants (BOD, etc.), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;
 - e. Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40°C (104°F), unless the Regional Board approves alternate temperature limits;
 - f. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;
 - g. Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and
 - h. Any trucked or hauled pollutants, except at points predesignated by the Discharger.
13. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the legal authorities, programs, and controls necessary to ensure that indirect discharges do not introduce pollutants into the sewerage system that, either alone or in conjunction with a discharge or discharges from other sources:
- a. Flow through the system to the receiving water in quantities or concentrations that cause a violation of this Order, or
 - b. Inhibit or disrupt treatment processes, treatment system operations, or biosolids processes, use, or disposal and either cause a violation of this Order or prevent biosolids use or disposal in accordance with this Order.
14. Prior to making any change in the discharge point, place of use, or purpose of use of the wastewater, the Discharger shall obtain approval of, or clearance from the State Water Resources Control Board (Division of Water Rights).
15. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, address and telephone number of the persons responsible for contact with the Board and a statement. The statement shall comply with the signatory paragraph of Standard Provision D.6 and state that the new owner or operator assumes full responsibility for compliance with this Order.

Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

I, GARY M. CARLTON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 16 March 2001.


GARY M. CARLTON, Executive Officer

AMENDED

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 5-01-067

NPDES NO. CA0079049

FOR
CITY OF DAVIS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

Specific sample stations shall be established such that the samples are representative of the volume and nature of the discharge and under direction of the Board's staff. The locations of the stations shall be approved by Regional Board staff.

INFLUENT MONITORING

Samples shall be collected at approximately the same time as effluent samples and should be representative of the influent. All influent monitoring results shall be submitted monthly except Priority Pollutants, which are to be submitted quarterly. Influent monitoring shall include at least the following:

<u>Constituent</u>	<u>Units</u>	<u>Sample Type</u>	<u>Sampling Frequency</u>
Flow	mgd	Meter	Continuous
Hardness	mg/l	Grab	Monthly
Electrical Conductivity (EC) at 25 °C	µmhos/cm	Grab	Daily
pH	--	Grab	Daily
BOD ¹	mg/l, lbs/day	24 hr. Composite ²	3Xs/wk
Total Suspended Solids (TSS)	mg/l, lbs/day	24 hr. Composite ²	3Xs/wk
Ammonia	mg N/l	Grab	3Xs/wk
Priority Pollutants	µg/l	As Appropriate ^{2,3}	Twice a Year

¹ 5-day, 20° C biochemical oxygen demand (BOD)

² Volatile samples shall be grab samples, the remainder shall be 24-hour composite samples

³ Composite samples shall be flow proportional

EFFLUENT MONITORING (001, 002)

1. Effluent samples shall be collected downstream from the last connection through which wastes can be admitted into any outfall. Effluent samples should be representative of the total volume and quality of the discharge. Date and time of collection of samples shall be recorded and reported. Dioxin, aluminum and Priority Pollutant monitoring results shall be submitted quarterly. All other effluent monitoring results shall be submitted monthly. Effluent monitoring shall include at least the following:

MONITORING AND REPORTING PROGRAM NO. 5-01-067
CITY OF DAVIS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

- 2 -

<u>Constituents</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency*</u>
Flow ¹	mgd	Meter	Continuous
Chlorine Residual (after dechlorination)	mg/l, lbs/day	Meter	Continuous
Turbidity	NTU	Meter ¹⁴	Continuous
pH	--	Meter ¹³	Continuous
Temperature	°F or C°	Grab ²	Daily
Electrical Conductivity (EC) at 25 °C	µmhos/cm	Grab ²	Daily
Total Coliform Organisms	MPN/100 ml	Grab ²	5Xs/wk
Ammonia ³	mg N/l, lbs/day	Grab ²	5Xs/wk
BOD ^{4,5}	mg/l, lbs/day	24 hr. Composite ⁵	5Xs/wk
Total Suspended Solids (TSS)	mg/l, lbs/day	24 hr. Composite ⁵	5Xs/wk
Settleable Solids (SS)	ml/l	Grab ²	Daily
Oil and Grease	mg/l, lbs/day	Grab ²	Monthly
Total Dissolved Solids (TDS)	mg/l	Grab ²	Monthly
Hardness	mg/l	Grab ²	Monthly
Copper	µg/l	Grab ²	Monthly
Bis(2-ethylhexyl) phthlate	µg/l	Grab ²	Monthly
Nitrate	mg/l	Grab ²	Monthly
Polycyclic aromatic hydrocarbon ¹⁵	µg/l	Grab ²	Monthly
Selenium	µg/l	Grab ²	Monthly
Organochlorine Pesticides	µg/l	Grab ²	Monthly
Aluminum	µg/l, lbs/day	Grab ²	Quarterly
Chromium VI	µg/l	Grab ²	Quarterly
Dioxin (2,3,7,8-TCDD) & congeners	µg/l	Grab ²	Quarterly
Acute Bioassay ⁶	% Survival	Grab ²	Quarterly
Chronic Bioassay ⁶	% Survival	Grab ²	Quarterly
Priority Pollutants ^{7, 8, 9, 10}	µg/l, lbs/day	As Appropriate ^{2, 11, 12}	Quarterly

¹ In addition to the total effluent flow, the flow discharged at each discharge point, 001 and 002, shall also be monitored continuously and reported monthly.

² Grab samples shall not be collected at the same time each day.

³ pH and temperature data shall be collected on the same date and at the same time as the ammonia sample.

⁴ 5-day, 20 °C biochemical oxygen demand (BOD)

⁵ The BOD, TSS, and SS samples shall be flow proportional composite samples.

⁶ Acute Bioassays shall be conducted in accordance with EPA/600/4-90/027, or later amendment, with Board staff approval, using rainbow trout, *Oncorhynchus mykiss*, as the test species. Temperature and pH shall be recorded at the time of bioassay collection.

⁷ Hardness, pH, and temperature data shall be collected at the same time and on the same date as the Priority Pollutant samples.

⁸ All peaks are to be reported, along with any explanation provided by the laboratory.

⁹ If any single sample of copper exceeds the 4-Day Average Effluent Limit, the Discharger shall conduct additional sampling for 4 consecutive days for those constituents that exceeded the 4-Day Average.

¹⁰ Priority Pollutants is defined as U.S. EPA Priority Pollutants and consists of the constituents listed in the most recent National Toxics Rule and California Toxics Rule.

¹¹ Volatile samples shall be grab samples; the remainder shall be 24-hour composite samples.

¹² Composite samples shall be flow proportional.

¹³ Except when discharging at 002, then a daily grab sample.

¹⁴ To monitor after the filters after the year 2006.

¹⁵ Polycyclic aromatic hydrocarbons, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene.

* At specified frequency or when discharged.

2. The Discharger shall calculate and record daily effluent limits for ammonia, and quarterly effluent limits for ammonia and copper as described below and in Order B.1 (Effluent Limitations) of Waste Discharge Requirements Order No. (attached). The ammonia effluent limits shall be reported in mg N/l and lbs/day and copper limits shall be reported in $\mu\text{g/l}$ and lbs/day. Ammonia and copper limit calculations shall be included with the monthly effluent monitoring results.

<u>Constituent</u>	<u>Effluent Limit</u>	<u>Units</u>	<u>1-Hour Average</u>	<u>4-Day Average</u>	<u>30-Day Average</u>	<u>Recording Frequency*</u>
Ammonia	Concentration	mg N/l	Attachment B	--	Attachment C	Daily
	Mass	lbs/day	¹	--	¹	Daily
Copper	Concentration	$\mu\text{g/l}$	Attachment D	Attachment D	--	Monthly ²
	Mass	lbs/day	¹	¹	--	Monthly ²

¹ Using the value, in mg/l, determined from Attachment B, C, or D (as appropriate), calculate the lbs per day using the formula: $x \text{ mg/l} \times 8.345 \times 7.5 \text{ mgd} = y \text{ lbs/day}$.

² Effluent limits must be calculated for any copper samples.

* At specified frequency or when discharged.

3. If the discharge is intermittent rather than continuous, then on the first day of each such intermittent discharge, the Discharger shall monitor and record data for all of the constituents listed above, after which the frequencies of analysis given in the schedule shall apply for the duration of each such intermittent discharge. In no event shall the Discharger be required to monitor and record data more often than twice the frequencies listed in the schedule.

RECEIVING WATER MONITORING

1. All receiving water samples shall be grab samples. Receiving water monitoring stations are located as follows:

<u>Point of Discharge</u>	<u>Station</u>	<u>Description</u>
Willow Slough Bypass (001)	R-1	30 feet upstream from the point of discharge
	R-2	200 feet downstream from the point of discharge
Conaway Ranch Toe Drain (002)	R-3	30 feet upstream from the point of discharge
	R-4	375 feet downstream from the point of discharge

2. All receiving water monitoring results, log notations, and notes shall be reported monthly.
3. All receiving water samples shall be grab samples. Date and time of sample collection shall be recorded and reported. Receiving water monitoring shall include at least the following:

<u>Constituents</u>	<u>Units</u>	<u>Sampling Stations</u>	<u>Frequency¹</u>
Dissolved Oxygen (DO)	mg/l	R-1 through R-4	Weekly
pH	--	R-1 through R-4	Weekly
Temperature	°F and °C	R-1 through R-4	Weekly
Electrical Conductivity (EC) at 25 °C	µmhos/cm	R-1 through R-4	Weekly
Hardness	mg/l	R-1 through R-4	Weekly
Turbidity	NTU	R-1 through R-4	Monthly
Ammonia*	mg N/l	R-1 through R-4	Monthly
Fecal Coliform Organisms	MPN/100ml	R-1 through R-4	Quarterly
Radionuclides	PCi/l	R-1 through R-4	Annually

* pH and temperature shall be determined at the time of sample collection for ammonia

¹ At specified frequency or when discharged.

4. In conducting the receiving water sampling, a separate log shall be kept of the receiving water conditions. Attention shall be given to the presence or absence of:

- | | |
|---------------------------------|--|
| a. Floating or suspended matter | e. Visible films, sheens, or coatings |
| b. Discoloration | f. Fungi, slimes, or objectionable growths |
| c. Bottom deposits | g. Potential nuisance conditions |
| d. Aquatic life | h. Flow Direction |
| | i. Upstream Conditions |

5. Notes on receiving water conditions shall be summarized in the monitoring report.

THREE SPECIES CHRONIC TOXICITY MONITORING

Chronic toxicity monitoring shall be conducted to determine whether the effluent is contributing toxicity to Willow Slough Bypass and Conaway Ranch Toe Drain. The testing shall be conducted as specified in U.S. EPA 600/4-91/002. Chronic toxicity samples shall be collected from the effluent of the Davis Wastewater Treatment Plant. Grab samples shall be representative of the volume and quality of the discharge. Time of collection of samples shall be recorded. The effluent tests must be conducted with concurrent reference toxicant tests. Monthly laboratory reference toxicant tests may be substituted upon approval. Both the reference toxicant and effluent tests must meet all test acceptability criteria as specified in the chronic manual. If the test acceptability criteria are not achieved, then the Discharger must re-sample and re-test within 14 days.

Chronic toxicity monitoring results are to be submitted quarterly. Chronic toxicity monitoring shall include the following:

Species: *Pimephales promelas* (larval stage), *Ceriodaphnia dubia*, and *Selenastrum capricornutum*

Frequency: Once per quarter, four quarters per year

MONITORING AND REPORTING PROGRAM NO. 5-01-067
CITY OF DAVIS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

- 5 -

Dilution Series:

	<u>Dilutions (%)</u>	<u>Controls</u>	
	<u>100</u>	<u>Creek Water</u>	<u>Lab Water</u>
% WWTP Effluent ¹	100	0	0
% Dilution Water*	0	100	0
% Lab Water	0	0	100

* Dilution water shall be taken individually from Willow Slough Bypass upstream of discharge point 001. When stream flow is absent, the analyses may be conducted with undiluted effluent. The dilution series may be altered upon written approval of Board staff. Dilution water chronic testing maybe eliminated after two years by staff if no toxicity is found.

¹ Effluent to be collected after dechlorination.

POND MONITORING

The following shall constitute the monitoring requirements for the facility oxidation, aerated and lemna ponds:

<u>Constituents</u>	<u>Units</u>	<u>Sampling Frequency</u>
Freeboard	Feet	Daily
pH	pH units	Weekly
Electrical Conductivity	µmhos/cm	Weekly
Odors	Observation	Weekly
Levee Condition	Observation	Weekly
Dissolved Oxygen (DO)	mg/l	Monthly

WETLANDS MONITORING

WETLANDS INFLUENT³/EFFLUENT MONITORING:

A monitoring station shall be established at each major inlet and outlet point for the measurement and collection of representative samples of the influent and effluent. The influent/effluent monitoring shall consist of the following:

<u>Constituent</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency*</u>
Selenium	µg/l	Grab	Monthly
Chronic Toxicity	----	Grab	Quarterly
Metals ¹	µg/l	Grab	Quarterly
Ammonia ²	mg/l	Grab	Monthly

MONITORING AND REPORTING PROGRAM NO. 5-01-067
CITY OF DAVIS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

- 6 -

<u>Constituent</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency*</u>
pH	pH units	Grab	Monthly
Specific Conductivity	µmhos/cm	Grab	Monthly
Temperature	°F or °C	Grab	Monthly
Hardness	mg/l	Grab	Quarterly

¹ Metal sampling shall include Aluminum, Antimony, Arsenic, Cadmium, Chromium III, Chromium VI, Copper, Lead, Mercury, Nickel, Silver, and Zinc.

² pH and temperature shall be determined at the time of sample collection for ammonia

³ Influent sampling may be sampled immediately after dechlorination

* At specified frequency. If not discharging effluent, no effluent monitoring is required.

WATER COLUMN MONITORING

Sampling stations shall be established at representative points in the wetlands sufficient to characterize the water column quality. A minimum of three sampling points shall be established. Water column monitoring shall include the following:

<u>Constituent</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency</u>
Selenium	µg/l	Grab	Monthly
Metals ¹	µg/l	Grab	Quarterly
pH	pH units	Grab	Monthly
Temperature	°F or °C	Grab	Monthly
Hardness	mg/l	Grab	Quarterly
Dissolved Oxygen	mg/l	Grab	Monthly

¹ Metal sampling shall include Aluminum, Antimony, Arsenic, Cadmium, Chromium III, Chromium VI, Copper, Lead, Mercury, Nickel, Silver, and Zinc.

FOOD CHAIN MONITORING

A wetlands food chain monitoring program shall be established to evaluate the selenium concentration in two aquatic invertebrate species. Appropriate species shall be determined on-site but shall include one benthic species. Samples shall be collected and analyzed annually during April and May. Sample size, species and locations shall be established under direction of Board staff.

SEDIMENT MONITORING

Composite sediment samples shall be taken during the water bird nesting season (April or May) from the upper 2-3 inches of wetland sediments at the same locations as the food chain samples. Sediment monitoring shall consist of the following:

<u>Constituent</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency</u>
Selenium	mg/kg	Grab	Annually
Metals ¹	mg/kg	Grab	Annually

¹ Metal sampling shall include Aluminum, Antimony, Arsenic, Cadmium, Chromium III, Chromium VI, Copper, Lead, Mercury, Nickel, Silver, and Zinc.

WILDLIFE MONITORING

Wildlife monitoring shall consist of a wildlife census and avian egg monitoring. The census shall be conducted on an established transect that is representative of the wetlands. The survey's focus shall be on aquatic birds, but incidental observations of other wildlife species also shall be recorded. The census shall be conducted every other month throughout the year. Avian eggs shall be collected and evaluated for selenium content annually from February through June. The program shall monitor at least one shorebird and one waterfowl species. A minimum of ten eggs per species will be collected using not more than one egg per sample nest except when there are less than ten nests. If there are less than ten nests for some species, then one egg per nest must be collected. Egg sampling shall take place in representative locations throughout the wetlands.

GROUNDWATER MONITORING

- Groundwater grab samples shall be collected from all groundwater monitoring wells. Prior to sampling, the wells should be pumped until the temperature, specific conductivity, and pH have stabilized to ensure representative samples.
- The following shall constitute the groundwater monitoring program:

<u>Constituents</u>	<u>Units</u>	<u>Sampling Frequency</u>
Depth to Groundwater	feet	Monthly
Groundwater Elevation	feet	Monthly
pH	--	Monthly
Electrical Conductivity (EC) at 25 °C	µmhos/cm	Monthly
Nitrates	mg/l	Quarterly
Total Coliform Organisms	MPN/100ml	Quarterly
Heavy Metals (Title 22)	mg/l	Annually
Volatile Organics (U.S. EPA 601)	µg/l	Annually
Semi-Volatile Organics (U.S. EPA 602)	µg/l	Annually
Oxygenate Compounds (U.S. EPA 8260)	µg/l	Annually

3. Groundwater monitoring results for the constituents above shall be submitted monthly and include a site map showing the location of the wells and the direction and gradient of ground water flow.
4. A groundwater report shall be submitted annually, which contains a brief written description of any groundwater investigation and sampling work completed for the year, a site map showing the location of all monitoring wells, and tables showing all groundwater monitoring data collected since the wells were installed, including groundwater depth and elevation data, pH, EC, and all other monitored constituents.

BIOSOLIDS MONITORING

1. A composite sample of biosolids shall be collected hourly during the hours of biosolids wasting over a 24-hour period and in accordance with U.S. EPA's POTW Biosolids Sampling and Analysis Guidance Document, August 1989, (or most recent edition) and tested for the following constituents:

<u>Constituent</u>	<u>Units</u>	<u>Sample Type</u>	<u>Frequency</u>
Quantity	Dry Tons	-----	Daily
Solids Content	% percentage	-----	Daily
Disposal Location	-----	-----	Daily
Cadmium	mg/kg	Composite	Quarterly
Copper	mg/kg	Composite	Quarterly
Chromium	mg/kg	Composite	Quarterly
Lead	mg/kg	Composite	Quarterly
Mercury	mg/kg	Composite	Quarterly
Nickel	mg/kg	Composite	Quarterly
Selenium	mg/kg	Composite	Quarterly
Silver	mg/kg	Composite	Quarterly
Zinc	mg/kg	Composite	Quarterly
PCB's	mg/kg	Composite	Quarterly
Oil and Grease	mg/kg	Composite	Quarterly
Nitrogen ¹	mg/kg (dry)	Composite	Quarterly
Ammonia	mg/kg (dry)	Composite	Quarterly
Nitrate	mg/kg (dry)	Composite	Quarterly
Total Kjeldahl Nitrogen	mg/kg (dry)	Composite	Quarterly
pH ¹	pH units	Composite	Quarterly
<u>Fecal Coliform¹</u>	MPN/gram dry wt.	Composite	Quarterly

¹ Samples for nitrogen, pH and fecal coliforms shall be collected from dry biosolids.

2. Sampling records shall be retained for a minimum of five years. A log shall be kept of the quantity of biosolids generated and of the handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.

3. Discharger shall submit annually:
 - a. The biosolids composite sample results.
 - b. Annual production of biosolids in dry tons and percent solids.
 - c. A schematic diagram showing biosolids handling facilities and a solids flow diagram.
 - d. Depth of application and drying time for biosolids drying beds.
 - e. A description of disposal methods, including the following information related to the disposal methods used at the facility. If more than one method is used, include the percentage of annual biosolids production disposed by each method.
4. Within 90 days of the effective date of this Order, the Discharger shall submit characterization of biosolids quality, including percent solids and quantitative results of chemical analysis for the priority pollutants listed in 40 CFR 122 Appendix D, Tables II and III (excluding total phenols). All biosolids samples shall be a composite of a minimum of twelve (12) discrete samples taken at equal time intervals over 24 hours. Suggested methods for analysis of biosolids are provided in U.S. EPA publications titled "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods" and "Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater". Recommended analytical holding times for biosolids samples should reflect those specified in 40 CFR 136.6.3(e). Other guidance is available in EPA's POTW Biosolids Sampling and Analysis Guidance Document, August 1989 (or most recent edition).

POST ON-SITE BIOSOLIDS APPLICATION REPORT

A post-application report shall be submitted after each application of biosolids on-site. The report shall include:

1. Identification of the application area(s), including a map showing the site covered.
2. Total volume (cubic yards) and weight (dry tons) of biosolids applied.
3. Tons of wet biosolids per acre and tons of dry biosolids per acre applied.
4. Kilograms per hectare of metals and pounds per acre of total nitrogen applied.
5. A statement concerning compliance with biosolids disposal restrictions identified in the Waste Discharge Requirements. The compliance report shall include, but is not limited to, an assessment of cumulative metals and nitrogen loadings from all sources, type of crop grown, nitrogen demand and setback and runoff compliance.

Sampling records shall be retained for a minimum of five years. A log shall be kept of biosolids quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Water supply monitoring results shall be submitted three times per year. Water supply monitoring shall include at least the following:

<u>Constituents</u>	<u>Units</u>	<u>Sampling Frequency</u>
Total Dissolved Solids (TDS)	mg/l	Three Times/Year
Electrical Conductivity (EC) at 25°C *	μmhos/cm	Three Times/Year
Selenium	mg/l	Three Times/Year

* If the source water is from more than one well, the EC shall be reported as a weighted average and include copies of supporting calculations.

REPORTING

1. Monitoring results shall be submitted to the Regional Board by the **1st day of the second month following sample collection**. Quarterly and annual monitoring results shall be submitted by the **1st day of the second month following each calendar quarter (May, August, November, and February) and year (February)**, respectively.
2. All constituents for all sections of the Monitoring and Reporting Program, that are monitored monthly (or several times per month), shall be submitted in one monthly report. All constituents for all sections of the Monitoring and Reporting Program, that are monitored quarterly, shall be submitted with the appropriate monthly report. All constituents monitored annually, and all sections of the Monitoring and Reporting Program with annual reporting requirements, shall be submitted in one annual report.
3. In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the time and date of sample collection, the constituents, and the concentrations are readily discernible. The data shall be summarized to illustrate clearly whether the discharge complies with waste discharge requirements. The highest daily maximum for the month, monthly and weekly averages, and medians, and removal efficiencies (%) for BOD and Suspended Solids, should be determined and recorded.
4. If the Discharger monitors any pollutant at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the discharge monitoring report form. Such increased frequency shall be indicated on the discharge monitoring report form.
5. By **30 January of each year**, the Discharger shall submit a written report to the Executive Officer containing the following:

MONITORING AND REPORTING PROGRAM NO. 5-01-067
CITY OF DAVIS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

- 11 -

- a. The names, certificate grades, and general responsibilities of all persons employed at the Davis Wastewater Treatment Plant (Standard Provision A.5).
- b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
- c. A statement certifying when the flow meter and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration (Standard Provision C.6).
- d. A statement certifying whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment plant as currently constructed and operated, and the dates when these documents were last revised and last reviewed for adequacy.

The Discharger may also be requested to submit an annual report to the Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

All reports submitted in response to this Order shall comply with the signatory requirements of Standard Provision D.6.

The Discharger shall implement the above monitoring program on the first day of the month following effective date of this Order.

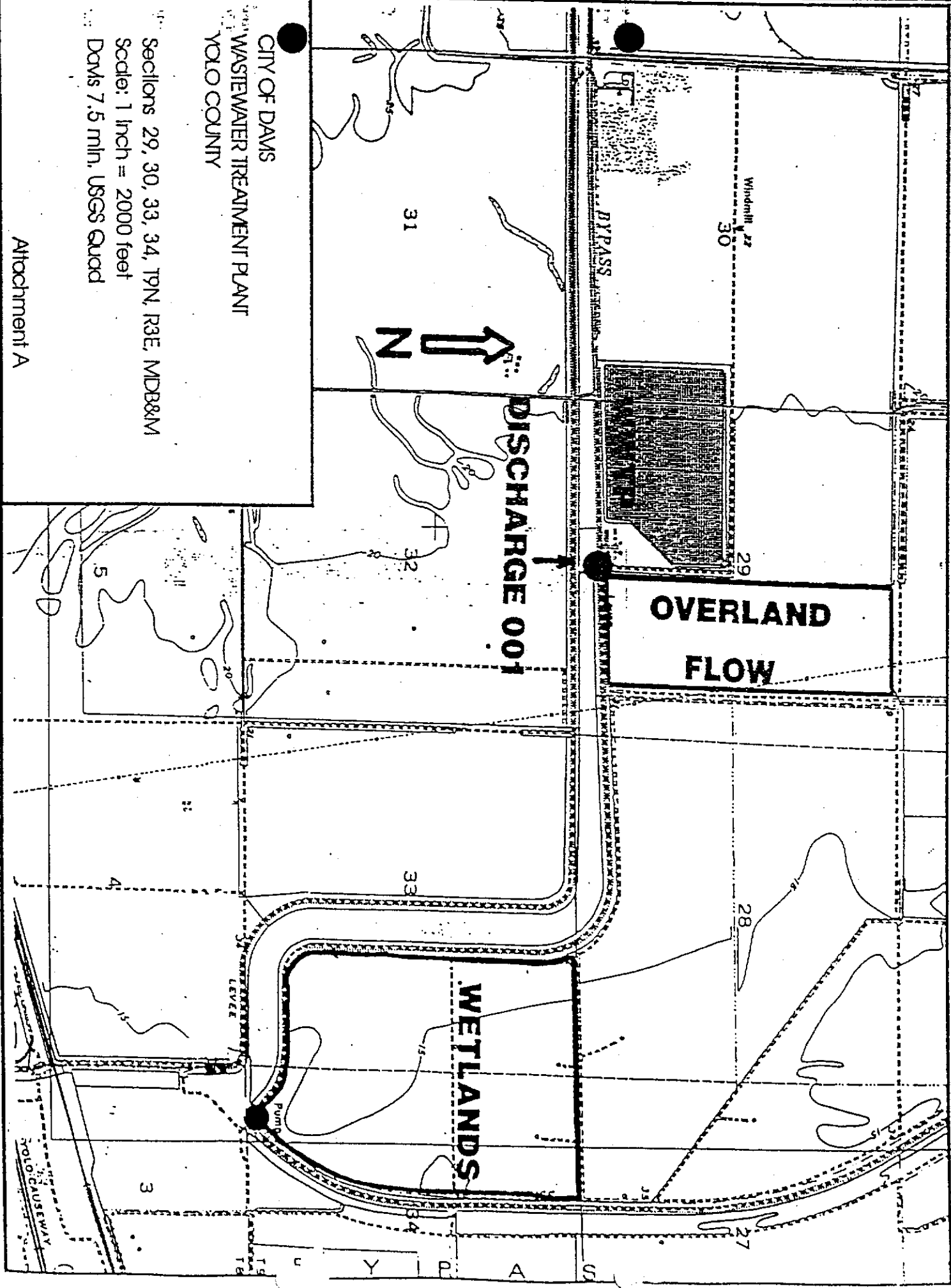
Ordered by:


GARY M. CARLTON, Executive Officer

16 March 2001

(Date)

AMENDED
KCH:lm



CITY OF DAMS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

Sections 29, 30, 33, 34, 19N, R3E, MDB&M
Scale: 1 inch = 2000 feet
Dows 7.5 min. USGS Quad

Attachment A

ATTACHMENT B

U.S. EPA NATIONAL AMBIENT WATER QUALITY CRITERIA RECOMMENDED TO PROTECT FRESHWATER AQUATIC LIFE

TOTAL AMMONIA NITROGEN pH-DEPENDENT VALUES (ACUTE CRITERIA)

pH	Maximum Concentration 1-hour Average (mg N/l) *
6.5	32.6
6.6	31.3
6.7	29.8
6.8	28.0
6.9	26.2
7.0	24.1
7.1	21.9
7.2	19.7
7.3	17.5
7.4	15.3
7.5	13.3
7.6	11.4
7.7	9.64
7.8	8.11
7.9	6.77
8.0	5.62
8.1	4.64
8.2	3.83
8.3	3.15
8.4	2.59
8.5	2.14

* Criteria Maximum Concentration (CMC) with Salmonids Present

$$CMC = \frac{0.275}{1 + 10^{(7.204 - pH)}} + \frac{39.0}{1 + 10^{(pH - 7.204)}}$$

ATTACHMENT C
U.S. EPA NATIONAL AMBIENT WATER QUALITY CRITERIA
RECOMMENDED TO PROTECT FRESHWATER AQUATIC LIFE

TOTAL AMMONIA
pH- AND TEMPERATURE-DEPENDENT VALUES (CHRONIC CRITERIA)

CCC* for Fish Early Life Stages Present, mg N/l										
pH	Temperature, °C									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.778	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

* Criteria Continuous Concentration

ATTACHMENT D
CALIFORNIA TOXICS RULE AND USEPA NATIONAL RECOMMENDED WATER
QUALITY CRITERIA TO PROTECT FRESHWATER AQUATIC LIFE

COPPER (Expressed as dissolved metal)

Hardness (mg/l as CaCO ₃)	Continuous Conc. 4-Day Avg. (µg/l) ¹	Maximum Conc. 1-hour Avg. (µg/l) ²
<25	Must Calculate	Must Calculate
25	2.7	3.6
30	3.2	4.3
35	3.7	5.0
40	4.1	5.7
45	4.5	6.3
50	5.0	7.0
55	5.4	7.7
60	5.8	8.3
65	6.2	9.0
70	6.6	9.6
75	7.0	10
80	7.4	11
85	7.8	12
90	8.2	12
95	8.6	13
100	9.0	13
110	9.7	15
120	11	16
130	11	17
140	12	19
150	13	20
160	13	21
170	14	22
180	15	23
190	16	25
200	16	26
210	17	27
220	18	28
230	18	30
240	19	31
250	20	32
260	20	33
270	21	34
280	22	36
290	22	37
300	23	38
310	24	39
320	24	40
330	25	41
340	26	43
350	26	44
360	27	45
370	27	46
380	28	47
390	29	48
400	29	50
>400	29	50

¹ Criteria Continuous Concentration (4-day Average) =
(e{0.8545[ln(hardness)] - 1.702} x (0.960)

² Criteria Maximum Concentration (1-hour Average) =
(e{0.9422[ln(hardness)] - 1.700} x (0.960)

ATTACHMENT E
NATIONAL TOXICS RULE TO PROTECT FRESHWATER AQUATIC LIFE IN
CALIFORNIA

CHROMIUM III (Expressed as dissolved metal)

Hardness (mg/l as CaCO ₃)	Continuous Conc. 4-Day Avg. (µg/l) ¹	Maximum Conc. 1-hour Avg. (µg/l) ²
<25	Must Calculate	Must Calculate
25	57	180
30	66	200
35	75	230
40	84	260
45	93	290
50	100	310
55	110	340
60	120	360
65	130	390
70	130	410
75	140	430
80	150	460
85	160	480
90	160	500
95	170	530
100	180	550
110	190	590
120	210	640
130	220	680
140	230	720
150	250	760
160	260	810
170	270	850
180	290	890
190	300	930
200	310	970
210	330	1000
220	340	1000
230	350	1100
240	360	1100
250	380	1200
260	390	1200
270	400	1200
280	410	1300
290	430	1300
300	440	1300
310	450	1400
320	460	1400
330	470	1500
340	480	1500
350	500	1500
360	510	1600
370	520	1600
380	530	1600
390	540	1700
400	550	1700
>400	550	1700

¹ Criteria Continuous Concentration (4-day Average) =
(e{0.8190[ln(hardness)] + 1.561} x (0.860)

² Criteria Maximum Concentration (1-hour Average) =
(e{0.8190[ln(hardness)] + 3.6888} x (0.316)

FACT SHEET

ORDER NO. 5-01-067
NPDES NO. CA0079502
CITY OF DAVIS
DAVIS WASTEWATER TREATMENT PLANT
YOLO COUNTY

SCOPE OF PERMIT

This renewed Order regulates the discharge of up to 7.5 million gallons per day (mgd), design average dry weather flow (ADWF), of effluent from the City of Davis's (Discharger) Wastewater Treatment Plant. This Order includes effluent and ground and surface water limits; pond, biosolids disposal, and wetland monitoring and reporting requirements; additional study requirements; and reopener provisions for several effluent constituents. The discharge is currently governed by Waste Discharge Requirements Order No. 99-014 (NPDES No. CA0079049), adopted by the Board on 30 April 1999.

FACILITY DESCRIPTION

The existing treatment system consists of the following:

For Discharge Point 001 – the treatment train consists of screening, aerated grit removal, primary sedimentation, flow split between two aerated ponds and one lemna pond and three oxidation ponds, overland flow and chlorination and dechlorination. The treatment train is flexible and varies according to the flow and season.

For Discharge Point 002 – the treatment system consists of the same treatment train as Discharge 001 then routed into a series of wetland pond tracts (up to seven tracts). All the wetland tracts have recirculation capability. The wetlands process was added to the treatment process to principally provide for the removal of metals concentrations. A stormwater lagoon in the wetlands is used in the winter months for treatment of stormwater runoff from the City's core area and north and west sectors. Stormwater and domestic wastewater may be commingled in the wetlands.

Biosolids is anaerobically digested, dewatered in on-site lagoons and land applied on-site in the overland flow slopes south of the oxidation ponds or the wetlands in accordance with the facility's biosolids management plan or disposed off-site at the Yolo County Central Landfill.

DISCHARGE POINTS

Treated municipal wastewater is discharged to two points; Willow Slough Bypass, a water of the United States and a tributary to the Yolo Bypass at the point (001), latitude 38° 35' 24", and longitude 121° 39' 50" and the Conaway Ranch Toe Drain, a tributary to the Yolo Bypass, at the point (002), latitude 38° 34' 33" and the longitude 121° 38' 02". Willow Slough Bypass is tributary to the Conaway Ranch Toe Drain and both streams drain to the Yolo Bypass.

RECEIVING WATER BENEFICIAL USES

The beneficial uses of Willow Slough Bypass and Conaway Ranch Toe Drain are not specifically identified in the Basin Plan, however the Plan states "The beneficial uses of any specifically identified water body generally apply to its tributary streams." The Board finds that the beneficial uses identified in the Basin Plan for the Yolo Bypass are applicable to Willow Slough Bypass and Conaway Ranch Toe Drain.

The beneficial uses of Yolo Bypass downstream of the discharge as identified in Table II-1 of the Basin Plan are agricultural irrigation, agricultural stock watering, body contact water recreation, other non-body contact water recreation, warm freshwater aquatic habitat, cold freshwater aquatic habitat, warm fish migration habitat, cold fish migration habitat, warm spawning habitat, and wildlife habitat.

DISINFECTION STANDARDS FOR DISCHARGE

Upstream of the discharge points, Willow Slough Bypass is an ephemeral/low flow stream. At times Willow Slough Bypass and Conaway Ranch Toe Drain, provide little or no dilution for wastewater effluent discharged from the Davis Wastewater Treatment Plant. These waterways are used for irrigation of crops. Wetlands constructed in the Yolo Bypass are used as an educational facility for thousands of school children and others interested in wildlife. The California Code of Regulations, Title 22, contains criteria for the reuse or recycling of wastewater as an alternative to discharging to a receiving stream. Title 22 reclamation criteria were established to create minimum wastewater treatment standards to protect the public health when this water is reused for beneficial uses. The criteria are not directly applicable to streams that receive wastewater and the subsequent use of the combined stream/wastewater. This permit does not apply Title 22 standards to the discharge.

However, in assessing the discharge standards necessary to protect the beneficial uses of Willow Slough Bypass, Conaway Ranch Toe Drain and the Yolo Bypass, Title 22 standards were compared to the level of treatment required to protect the public health when directly using undiluted effluent for food crop irrigation. Title 22 states that it is necessary for wastewater to receive tertiary treatment with a coliform count of 2.2 MPN/100 ml as a 7-day median, for reuse as irrigation water for food crops and to protect for unrestricted contact recreation. Willow Slough Bypass, a low flow/ephemeral stream, and Conaway Ranch Toe Drain, ephemeral streams, are essentially the same as any other conveyance system (pipe or canal) when sufficient upstream flows are not present for dilution.

If the Department of Health Services (DHS) has determined that a specific level of treatment is required for recycled water delivered in a dedicated pipe or canal, then that same level of treatment would be necessary to protect the public if the water is delivered in a dry streambed for these same uses. In a letter to Board staff, dated 8 April 1999, DHS concurred with the need to protect beneficial uses and recommended that the level of treatment required, under Title 22 of the California Code of Regulations, for reclaimed water in a dedicated pipe or canal, be applied to agricultural drains or streams where the water may be used or diverted for beneficial uses. Therefore, this permit includes tertiary effluent

limitations based on protecting the beneficial uses of contact recreation and agricultural irrigation in Willow Slough Bypass and Conaway Ranch Toe Drain and the Yolo Bypass.

The Board finds that tertiary treatment (filtration) is required to protect the beneficial uses of contact recreation and agriculture downstream of the discharge to Willow Slough Bypass and Conaway Ranch Toe Drain. The effluent limitation for coliform organisms is intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing pathogens. The method of treatment is not prescribed, but must meet the level of treatment or equivalent as specified in Title 22 and other recommendations by the California Department of Health Services. In addition to coliform testing, a turbidity effluent limitation has been included as a second indicator of the effectiveness of the treatment process and to assure compliance with the required level of treatment. The tertiary treatment process, or equivalent, is also capable of reliably meeting a reduced turbidity limitation of 2 NTU as a daily average. Failure of the filtration system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. Coliform testing, by comparison, is not conducted continuously and requires several hours to days to identify high coliform concentrations. Effluent limitations for both BOD and TSS have been established at 10 mg/l, as a monthly average, which is technically based on the capability of the designed tertiary system. Discharging only tertiary wastewater in conformance with the Department of Health Services recommendations protects the beneficial uses of water contact recreation and agricultural irrigation.

GROUNDWATER

Domestic wastewater discharged to ponds, may percolate through the soil and increase the concentrations of nitrates, metals, and other constituents in groundwater. The beneficial uses of the underlying groundwater are municipal and domestic, industrial service, industrial process, and agricultural supply. Drinking water and agricultural supply are the beneficial uses most likely affected by the constituents discharged. Constituent concentrations and indicator parameters, including total dissolved solids (TDS), electrical conductivity (EC), and biological oxygen demand, provide an indication of the level of pollution of the groundwater. The increase in the concentrations of these constituents in groundwater must be consistent with the antidegradation provisions of State Water Resources Control Board Resolution 68-16. To remain consistent with Resolution No. 68-16, wastewater discharged to land shall not degrade groundwater quality when compared to background, exceed water quality objectives, unreasonably affect beneficial uses, or cause pollution or nuisance.

Resolution No. 68-16 requires that the Discharger provide best practicable treatment or control discharge to groundwater. The Discharger has installed six groundwater monitoring wells, or compliance points, within the treatment plant boundaries on property owned by the Discharger. The regular monitoring of the groundwater for EC, nitrates and total coliform is required.

NO AVAILABLE DILUTION IN EFFLUENT LIMIT DETERMINATIONS

Willow Slough Bypass and the Conaway Ranch Toe Drain are ephemeral/low flow streams. The streams have very low or no flow during the dry seasons. At times, effluent discharge from the Davis Wastewater Treatment Plant may provide the majority of the flow in Willow Slough Bypass, with little or no dilution from natural flow.

Based on the available information, the worst-case dilution, in Willow Slough Bypass and the Conaway Ranch Toe is assumed to be zero to provide protection for the receiving water beneficial uses. The impact, of assuming zero dilution within the receiving water, is that effluent limitations are end-of-pipe limits instead of allowing for dilution within the receiving waters.

EFFLUENT LIMIT DETERMINATIONS/REASONABLE POTENTIAL ANALYSIS

Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numeric water quality standard. Once beneficial uses and applicable water quality criteria have been established for a water body, the Board must ensure that discharges do not cause exceedances of those criteria. If the Board determines that the discharge causes or has the reasonable potential to cause or contribute to an excursion of numeric or narrative water quality criteria, then Water Quality-Based Effluent Limits must be imposed.

On 5 February 1993, U.S. EPA adopted the National Toxics Rule (NTR), which established numeric criteria for priority toxic pollutants that interfere with beneficial uses of state waters. U.S. EPA also developed the National Ambient Water Quality Criteria to protect aquatic life, at considerable time and expense under public and scientific review. Effluent limitations are based, in part, on the August 1998 and December 1999 Updates of Ambient Water Quality Criteria for Ammonia and on the April 1999 *National Recommended Water Quality Criteria - Correction*, the most recent update of the National Ambient Water Quality Criteria. The U.S. EPA adopted the *California Toxics Rule* (CTR) on 18 May 2000. The CTR also establishes numeric criteria for priority toxic pollutants that interfere with beneficial uses of state waters. The State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan), which contains guidance on implementation of the NTR and CTR. This Order and the Basin Plan prohibit the discharge of toxic constituents in toxic amounts.

Monthly and quarterly monitoring reports, provided by the Discharger from December 1995 to December 1999, were a primary source of data for effluent limit determinations. Assuming zero dilution, and based on information submitted as part of the application and in studies, the Board finds that the proposed discharge has a reasonable potential to exceed standards and objectives for several constituents.

CITY OF DAVIS

DAVIS WASTEWATER TREATMENT PLANT

YOLO COUNTY

A. Priority Pollutants

Table 1 shows constituents that were detected in the Priority Pollutant analyses, from December 1995, through December 1999. Also included in the table are constituents that were not detected but the detection levels were higher than applicable water quality criteria. Table 2 shows the applicable water quality criteria that were used to develop effluent limits.

FACT SHEET ORDER NO. 5-01-067
CITY OF DAVIS
DAVIS WASTEWATER TREATMENT PLANT
YOLO COUNTY

TABLE 1: Davis Wastewater Treatment Plant - Priority Pollutant Sampling Results (all constituents in $\mu\text{g/l}$ except for tributyltin in ng/l and dioxin in pg/l)

Constituent	SAMPLE DATES											
	12/99	9/99	6/99 (002)	3/99	11/98	8/98	6/98	3/98	8/97	10/96	12/95	
<i>Priority Pollutants</i>												
Chromium III	<5	7.23	<10	5.5	7.4	<5	<5	14	1	300	3.9	
Copper	8.03	6.95	15.5	13	9.4	7.6	16.9	12	10	22	9.4	
Nickel	12.8	26.6	26.7	27	25.1	26.2	28.3	37	11	260	7.8	
Selenium	<5	6.87	<5	7.6	<0.05	<5	<5	<0.05	2.5	1.7	1.5	
Tributyltin	<2	<2	<2	<2	<2	<2	<2	<2	--	6	<2	
Bis(2-ethylhexyl) phthalate	41	5.9	7.7	0.19	<0.4	3.8	0.38	<0.1	0.6	<15	<15	
Benzo(a)anthracene	12	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.15	<5	
Benzo(a)pyrene	11	<0.2	<0.2	<0.2	2	<0.2	<0.2	<0.2	<0.2	<0.18	<5	
Benzo(b)fluoranthene	9.9	<0.1	<0.1	<0.1	1	<0.1	<0.1	<0.1	<0.1	<0.16	<5	
Benzo(k)fluoranthene	8.4	<0.1	<0.1	<0.1	2	<0.1	<0.1	<0.1	<0.1	<0.19	<5	
Chrysene	13	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<5	<5	
Dioxins and Congeners	9.0	nd	nd	nd	Nd	nd	7.2	9.5	nd	nd	Nd	
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.01	<0.009	<0.009	
Heptachlor	<0.025	<0.025	<0.025	<0.025	<0.025	0.0765	<0.25	<0.025	<0.01	<0.5	<0.07	
Heptachlor Epoxide	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.25	<0.025	<0.01	<0.5	<0.007	

CITY OF DAVIS
DAVIS WASTEWATER TREATMENT PLANT
YOLO COUNTY

TABLE 2: Regulatory and Water Quality Criteria

Constituent		CTR ⁵		NTR ¹	U.S. EPA's Ambient Water Quality Criteria for Freshwater Aquatic Life (µg/l)			
		Non-drinking water			Toxicity Information		Recommended Criteria	
					Acute	Chronic	4-Day Ave. Attachment E ^{2,3}	1-Hour Ave. Attachment E ^{2,3}
	Chromium III	--	--	--	--	11 ³	16 ³	
	Chromium (VI)	--	--	--	--	--	--	
	Chromium (Total)	--	--	--	--	Attachment D ^{2,3}	Attachment D ^{2,3}	
	Copper			--	--	Chart	Chart	
	Nickel	4600		--	--	5 ³	--	
	Selenium	--		--	--	--	--	
	Bis(2-ethylhexyl) phthalate	5.9		--	--	--	--	
	Benzo(a)anthracene	0.049		--	--	--	--	
	Benzo(a)pyrene	0.049						
	Benzo(b)fluoranthene	0.049						
	Benzo(k)fluoranthene	0.049						
	Chrysene	0.049						
	Dioxin	0.000000014						
	Endrin	0.81				0.0036	0.086	
	Heptachlor	0.00021				0.0038	0.58	
	Heptachlor Epoxide	0.00011				0.0038	0.58	
	Tributyltin					0.063	0.46	

¹ National Toxics Rule Standards

² Criteria are dependent on hardness

4 Basin Plan Water Quality Objective requires that persistent organochlorine pesticides not be present in receiving water at detectable concentrations

5 California Toxics Rule Standards

Heptachlor (Organochlorine Pesticides)

Samples from January 1995 and December 1999, showed that heptachlor was detected in one sample at 0.0765 $\mu\text{g/l}$. Heptachlor is part of a larger group of chlorinated hydrocarbon pesticides, which also includes DDD, DDE, DDT, Aldrin, Chlordane, Dieldrin, Endrin and Endrin Aldehyde, alpha and beta Endosulfan and Endosulfan Sulfate, Heptachlor and Heptachlor Epoxide, and Toxaphene. The analytical laboratories use the name Organochlorine Pesticides for this group of pesticides.

The Basin Plan

Regarding Pesticides, the Basin Plan, on page III-6.00, states in part:

- ♦ *"No individual pesticide... shall be present in concentrations that adversely affect beneficial uses.*
- ♦ *Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.*
- ♦ *Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer.*
- ♦ *Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies...*

Where more than one objective may be applicable, the most stringent objective applies."

The most stringent objective requires no detectable concentrations of pesticides in the water column. Heptachlor was detected in the effluent, thereby exceeding the Basin Plan Water Quality Objective.

None of the listed persistent chlorinated hydrocarbon pesticides may be detected in the effluent. The analytical methods may have method detection levels lower than 0.05 $\mu\text{g/l}$ but not higher.

Note that the minimum level for Toxaphene, achievable by the laboratories, is 0.5 $\mu\text{g/l}$, while the maximum allowable detection level required in the permit is 0.05 $\mu\text{g/l}$. The Discharger may have difficulty complying with the Toxaphene reporting requirements, particularly if Toxaphene is detected in the effluent.

Acrolein

Acrolein is soluble in water with a relatively low volatility. Acrolein is used directly as a biocide for aquatic weed control; for algae, weed, and mollusk control in recirculating process water systems; for slime control in the paper industry; and to protect liquid fuels against microorganisms. It is also used in leather tanning, for fixing histological samples, in the chemical industry, in photography, for textile treatment, in the manufacture of laundry and dishwasher detergents, and in coatings for aluminum and steel panels.

The NTR Standards for acrolein are U.S. EPA National Ambient Water Quality Criteria for Human Health. U.S. EPA also developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, including Acute and Chronic Toxicity Information. U.S. EPA showed that acrolein, at various concentrations, was observed to create acute and chronic toxicity effects on aquatic life. Toxicity information collected to establish Ambient Water Quality Criteria indicated that acute toxicity for acrolein occurred at $68 \mu\text{g/l}$ and chronic toxicity occurred at $21 \mu\text{g/l}$. Although acrolein was not detected, the detection level of $20 \mu\text{g/l}$ is so close to the $21 \mu\text{g/l}$ that this constituent needs to be closely monitored. No effluent limit is required at this time.

Bis(2-ethylhexyl) phthalate

Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR and NTR Standards for bis (2-ethylhexyl)phthalate. Bis (2-ethylhexyl)phthalate is a plasticizer that has a relatively low solubility in water and relatively low volatility. Bis (2-ethylhexyl) phthalate is added to plastic products to increase flexibility and is commonly found in products and containers, hospital and laundry discharges, and adhesives, paper, pesticides, and flexible plastic pipes and tubing. Its use in common products and industry indicate that it is a likely contaminant of the Discharger's wastewater confirming the reasonable potential of its presence.

The National Toxics Rule (NTR) and CTR Standards for bis(2-ethylhexyl)phthalate are Water Quality Criteria for Human Health. The NTR and CTR receiving water limit for Bis (2-ethylhexyl)phthalate is $5.9 \mu\text{g/l}$ where drinking water is not a designated beneficial use. At least seven samples showed bis(2-ethylhexyl)phthalate in the effluent. Two effluent samples exceeded CTR and NTR Standards for bis(2-ethylhexyl)phthalate. Effluent limitations for bis-(2-ethylhexyl)phthalate, based on the NTR and CTR Standards, are included in this Order.

Dioxins and furans

Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standards for halogenated aromatic hydrocarbons that include dioxin or its congeners, TCDD equivalents. HpCDD's total were 170 pg/l , 1,2,3,4,6,7,8- HpCDD was 95 pg/l and OCDD was 260 pg/l in the March 1998 sampling for the effluent. In December 1999, the total TCDDs were 9.0 pg/l in the wetlands. Additionally, furans were identified in the wastewater in March 1998. HxCDF's total was 26 pg/l , 1,2,3,4,7,8-HxCDF was 26 pg/l , HpCDF's were 50 pg/l and 1,2,3,4,7,8,9-HpCDF was 50 pg/l . These congeners have assigned Toxic Equivalency Factors relative to toxicity of 2,3,7,8-TCDD. The CTR receiving water limit for dioxin (2,3,7,8-TCDD) is $0.000000014 \mu\text{g/l}$ (or 0.014 pg/l) where drinking water is not a designated beneficial use. Laboratory data provided by the Discharger for wastewater treatment plant effluent of dioxin congener samples exceeded CTR Standards for dioxin. The SIP requires the inclusion of effluent limitations where the effluent sampling has exceeded the water quality standard. The effluent sampling which exceed the CTR water quality standard presents a reasonable potential for continued exceedance of the standard and an effluent limitation for dioxin is included in this Order. Dioxin is extremely toxic and stable and can be found wastewater effluent and biosolids.

Chromium III

As shown in Table 1, chromium was detected in seven of eleven samples at concentrations ranging between not detected and 300 $\mu\text{g/l}$. U.S. EPA developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for chromium. The CTR includes the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for chromium. The acute (1-hour average) and chronic (4-day average) criteria are hardness dependent. U.S. EPA represents the criteria in a table, equations, and a graph. The relative toxicity of chromium increases with decreasing hardness. The 4-day average criteria is calculated using the worst-case hardness for the receiving water. The hardness data provided by the Discharger, was for Willow Slough Bypass averaged 297 mg/l with a range of 190 - 420 mg/l. In the table created by U.S. EPA that shows the relationship between chromium and hardness, at the worst-case or lowest hardness concentration detected, 190 mg/l, the 4-day average toxic concentration of chromium would be 350 $\mu\text{g/l}$. The 1-hour average is calculated using the worst-case hardness for effluent. The worst-case hardness for the effluent is 386 mg/l and the 1-hour average concentration of chromium would be 5249 $\mu\text{g/l}$. The highest detection of total chromium at 300 $\mu\text{g/l}$ was detected prior to the improvements at the treatment plant and is less than the acute or chronic criteria. Therefore, no effluent limits for chromium III are necessary at this time. However, the Discharge needs to continue to monitor for chromium III. Additionally, subsequent lab quality analysis showed contaminated acid for preservation of the chromium sample resulted in the high concentration of 300 $\mu\text{g/l}$.

Chromium VI

Generally chromium is measured as total chromium without differentiation between chromium III and VI. Chromium VI is more toxic than chromium III. At this time, the discharger will be required to monitor for chromium VI and reopen the permit if chromium VI is found at toxic levels.

Copper

As shown in Table 1, copper was detected in eleven of eleven samples at concentrations ranging between 0.0076 and 22 $\mu\text{g/l}$. U.S. EPA developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for copper. The CTR includes the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for copper. The acute (1-hour average) and chronic (4-day average) criteria are hardness dependent. U.S. EPA represents the criteria in a table, equations, and a graph. The relative toxicity of copper increases with decreasing hardness. The 4-day average criteria is calculated using the worst-case hardness for the receiving water. The hardness data provided by the Discharger for Willow Slough Bypass averaged 297 mg/l with a range of 190 - 420 mg/l. In the table created by U.S. EPA that shows the relationship between copper and hardness, at the worst-case or lowest hardness concentration detected at Willow Slough Bypass is 190 mg/l, the 4-day average toxic concentration of copper would be 16 $\mu\text{g/l}$. The 1-hour average is calculated using the worst-case hardness for effluent. The worst-case hardness for the effluent is 386 mg/l and the 1-hour average concentration of copper would be 50 $\mu\text{g/l}$. Although the highest detected concentration was prior to the improvements at the facility, copper consistently continues to be detected. The highest detection level exceeds the water quality limit therefore, concentration based effluent limits for copper, based on the hardness dependent criteria (Attachment D) of the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, are included in this Order. The discharger submitted information on metal

translators. The Regional Board staff reviewed the data and determined it was inadequate to establish conversion factors. The information submitted lacked the documentation and methodology required by US EPA. The conversion factors for acute copper is 0.96 and for chronic is 0.96 as required in the CTR. A time schedule to allow the Discharger to come into compliance with the effluent limitation is also included in this Order.

Nickel

As shown in Table 1, nickel was detected in eleven of eleven samples at concentrations ranging between 0.025 and 260 $\mu\text{g/l}$. U.S. EPA developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for nickel. The CTR includes the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for nickel. The acute (1-hour average) and chronic (4-day average) criteria are hardness dependent. U.S. EPA represents the criteria in a table, equations, and a graph. The relative toxicity of nickel increases with decreasing hardness. The 4-day average criteria is calculated using the worst-case hardness for the receiving water. The hardness data provided by the Discharger, was for Willow Slough Bypass averaged 297 mg/l with a range of 190 – 420 mg/l. In the table created by U.S. EPA that shows the relationship between nickel and hardness, at the worst-case or lowest hardness concentration detected, 190 mg/l, the 4-day average toxic concentration of nickel would be

90 $\mu\text{g/l}$. The 1-hour average is calculated using the worst-case hardness for effluent. The worst-case hardness for the effluent is 386 mg/l and the 1-hour average concentration of nickel would be 1470 $\mu\text{g/l}$. However, the highest detection level occurred prior to the treatment plant improvements. The last samples showed concentrations of nickel are substantially lower than the limits. There is no effluent limit for nickel at this time, however, nickel needs to be closely monitored. Additionally, subsequent lab quality analysis showed contaminated acid for preservation of the nickel sample resulted in the high concentration of 260 $\mu\text{g/l}$.

Selenium

Based on information submitted as part of the application, in studies, and in monitoring reports, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standard for selenium. U.S. EPA developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life as recommended limitations to protect against aquatic toxicity. The CTR includes the Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for selenium at 5.0 $\mu\text{g/l}$ for the four-day limit. The effluent limit for selenium, included in this Order, is presented in total concentration, and is based on U.S. EPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life as included in the CTR. Selenium is a heavy metal and is present in the City's water supply. The City has successfully reduced selenium levels over the past several years, however, selenium is still detected as late as 1999 at 7.6 $\mu\text{g/l}$, after the construction of the wastewater treatment improvements including the wetlands process and continues to be a problem.

Tributyltin

Tributyltin is a biocide used to control a number of organisms and was detected in October 1996 at 6 ng/l in the effluent. Based on this detection, the City was required to closely monitor this constituent. Since the improvements at the wastewater treatment plant, tributyltin has not been detected. The City needs to continue to monitor for this constituent quarterly.

Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene. The CTR Standard for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene is 0.049 $\mu\text{g/l}$ for each constituent. In December 1999, the samples showed 12 $\mu\text{g/l}$, 11 $\mu\text{g/l}$, 9.9 $\mu\text{g/l}$, 8.4 $\mu\text{g/l}$ and 13 $\mu\text{g/l}$, respectively. Other laboratory samples provided by the Discharger for wastewater treatment plant effluent samples showed non-detect for these constituents however, the detection level exceeded the limit. Effluent limitations for polycyclic aromatic hydrocarbons, based on the CTR Standards, are included in the permit.

Electrical Conductivity (EC)

Domestic and industrial use of water results in an increase in the mineral content of the wastewater. The minerals include calcium, sodium, sulfate, and other dissolved salts. The salinity of wastewater is determined by measuring electrical conductivity (EC), an important parameter in determining the suitability of wastewater for irrigation. When water evaporates, salts accumulate in soil. With increasing salinity in the soil of the root zone, plants expend more energy on adjusting the salt concentration in plant tissues to obtain needed water from the soil, and less energy is available for growth.

To protect the beneficial use of water for agricultural use, studies have recommended an Agricultural Water Quality Goal of 700 $\mu\text{mhos/cm}$, for an average value of EC. EC data from the monthly monitoring reports from the Davis Wastewater Plant, have shown that the average value of EC has ranged between 1574 $\mu\text{mhos/cm}$ and 2317 $\mu\text{mhos/cm}$, which exceeds the average value recommended to protect agricultural uses. To reduce concentrations of dissolved salts in the effluent, the Discharger is required to conduct a study to identify sources of and control dissolved salts discharged within the collection system. Once the study has been completed, the Board may determine that effluent limitations for EC are necessary.

pH

The Basin Plan provides that the pH of surface waters shall not be depressed below 6.5 nor raised above 8.5 nor shall the discharge alter the ambient pH of the receiving water more than 0.5 units. In monthly reports from the Discharger from December 1998 – August 2000, the pH in the Davis Wastewater Treatment Plant effluent has ranged from a low of 7.3 to a high of 8.9 and has increased the pH of the receiving water more than 0.5 units. In dry months, Willow Slough Bypass and Conaway Ranch Toe Drain has low to no flow prior to the discharge, providing little or no dilution for effluent. An effluent limit specifies that effluent may not be discharged with a pH below 6.5 nor above 8.5. The pH of surface waters shall not be depressed below 6.5 nor raised above 8.5. A receiving water limit requires that the effluent shall not alter the ambient pH of the receiving water more than 0.5 units.

Coliform Organisms, Turbidity, BOD, and TSS

Tertiary treatment (filtration) is required to protect the beneficial uses of contact recreation and agriculture downstream of the discharge in Willow Slough Bypass and Conaway Ranch Toe Drain. The effluent limitation for coliform organisms is intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing pathogens. The method of treatment is not prescribed,

but must meet the level of treatment or equivalent as specified in Title 22 and other recommendations by the California Department of Health Services. In addition to coliform testing, a turbidity effluent limitation has been included as a second indicator of the effectiveness of the treatment process and to assure compliance with the required level of treatment. The tertiary treatment process, or equivalent, is also capable of reliably meeting a reduced turbidity limitation of 2 NTU as a daily average. Failure of the filtration system, such that virus removal is impaired, would normally result in increased particles in the effluent and higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. Coliform testing, by comparison, is not conducted continuously and requires several hours to days to identify high coliform concentrations. Effluent limitations for both BOD and TSS have been established at 10 mg/l, as a monthly average, which is technically based on the capability of the designed tertiary system.

Ammonia

Untreated wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrate, and denitrification is a process that converts nitrate to nitrogen gas, which is then released to the atmosphere. Wastewater treatment plants commonly use nitrification and denitrification processes to remove ammonia from the waste stream. Inadequate or incomplete nitrification or denitrification may result in the discharge of ammonia and nitrate to the receiving stream.

In water, un-ionized ammonia (NH_3) exists in equilibrium with the ammonium ion (NH_4). The toxicity of aqueous ammonia solutions to aquatic organisms is primarily attributable to the un-ionized ammonia form, with the ammonium ion form being relatively less toxic. Total ammonia refers to the sum of these two forms in aqueous solutions. Analytical methods are used to directly determine the total ammonia concentration, which is then used to calculate the un-ionized ammonia (toxic) concentration in water.

U.S. EPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for total ammonia, include acute (1-hour average) standards based on pH and chronic (30-day average) standards based on pH and temperature. U.S. EPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity affects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity affects with increasing temperature. U.S. EPA has presented the acute ammonia criteria in three ways, as equations, in a table, and in graphs that relate pH to ammonia concentrations. Attachment B shows the equation and table used when salmonids are present. The chronic criteria have been presented in a table shown in Attachment C.

The pH in the Davis Wastewater Treatment Plant effluent has ranged from a low of 7.3 to a high of 8.9. The Basin Plan provides that the pH of surface waters shall not be depressed below 6.5 nor raised above 8.5 nor altered more than 0.5 units. The total ammonia concentration in the effluent from the Davis Plant has ranged from 0.16 to 15.5 mg N/l from December 1998 to August 2000. The Ambient Water Quality Criteria maximum concentration for ammonia (see Attachment B) shows that the acute criteria could be 1.5 mg N/l depending on the pH at the time. Should a high pH occur at the same time that ammonia concentrations exceed the acute concentration for that pH, the effluent would be acutely toxic. The effluent temperature data from the Davis Plant ranges from 1.1 – 26 °C. The chronic criteria in Attachment C show that toxicity increases with increasing temperature and pH. The highest ammonia

concentration reported 15.5 mg N/l would cause chronic toxicity at any temperature in the table if that concentration were present over an extended period. The proposed discharge has a reasonable potential to exceed Ambient Water Quality Criteria for ammonia. In the Order, the concentration based effluent limitations for ammonia are copies of the tables and equations for ammonia presented in the U.S. EPA Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, and are shown in Attachment B (acute criteria) and Attachment C (chronic criteria).

Nitrate

Recent toxicity studies have indicated a possibility that nitrate is toxic to aquatic organisms. In the past, the Discharger has not collected effluent samples for nitrate analysis and the toxic effects, if any, of nitrate in the Davis Wastewater Treatment Plant effluent is not known.

The Discharger is to provide information as to whether levels of nitrate in the discharge cause or contribute to an in-stream excursion above a narrative or numeric water quality standard, and, if nitrate does cause or contribute to an in-stream excursion above a narrative or numeric water quality standard, require the Discharger to submit information to calculate effluent limitations for nitrate.

Chlorine Residual

Chlorine is a toxic constituent of wastewater. The Discharger uses chlorine as a disinfectant in the waste stream. For dechlorination, the Discharger uses sulfur dioxide, which combines with chlorine, to render it relatively unreactive and thus remove it from the waste stream. Based on experience, inadequate dechlorination may result in discharge of chlorine to the receiving stream. For chlorine, U.S. EPA has developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life. The maximum concentration for chlorine is 0.019 mg/l and the chronic or 4-day average is 0.011 mg/l. Rounded off, the limits are 0.02 mg/l and 0.01 mg/l. Concentration based effluent limitations for chlorine are based on these criteria.

KCH:lm